

October 18, 2021

Town of Millis Conservation Commission 900 Main Street Millis, MA 02054

RE: Notice of Intent and Request for Public Hearing

D'Angelis Water Treatment Plant PFAS Upgrades

Water Street, Millis

#### **Dear Commission Members:**

The Town of Millis Department of Public Works (DPW) is proposing to add granular activated carbon (GAC) filters and associated infrastructure to the D'Angelis Water Treatment Plant (D'Angelis WTP) in order to reduce levels of six per- and poly-fluoroalkyl substances (PFAS) in Town of Millis drinking water wells that exceed the new 20 nanograms per liter (ng/L) Massachusetts Maximum Contaminant Level (MCL). Two Town of Millis wells serviced by D'Angelis WTP are currently offline due to the elevated PFAS levels and require additional treatment via the GAC filters before they can be brought back online. The proposed filtration units and their associated infrastructure will require housing in a building. Adding on to the current building to accommodate the footprint required for filtration units is not feasible, so DPW is proposing to construct a new building for the GAC filters on the site of an existing storage building on an adjacent parcel.

A delineated bordering vegetated wetland protected under the Wetland Protection Act (WPA) (310 CMR 10.0) is located within 100 feet of the proposed limit of work. In accordance with the requirements of the WPA, please find enclosed copies of the Notice of Intent and reduced plan sheets (11"x17") for your review.

Federal Emergency Management Agency (FEMA) floodplain mapping for the Town of Millis shows the limits of work within the 100-year floodplain; however, the base floodplain elevation (BFE) reported by FEMA is 122 feet NAVD88, while the elevation within the limits of work is over 130 feet, as reported by a licensed surveyor. DPW is in the process of requesting a Letter of Map Amendment from FEMA to confirm that the limits of work are not within 100-year floodplain and therefore this area is not considered Bordering Land Subject to Flooding for the purposes of this Notice of Intent.

We respectfully request the Commission to schedule a public hearing for the Conservation Commission meeting on November 1, 2021 at Millis Town Hall. Please contact the DPW or myself at 617-498-4772 or tbernier@kleinfelder.com if you have any questions regarding this project. Thank you for your consideration on this matter.



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Respectfully yours,

Tyler Bernier Kleinfelder

cc: James McKay, Millis Department of Public Works



## Notice of Intent D'Angelis Water Treatment Plant PFAS Upgrades

Town of Millis, Massachusetts

October 2021



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## **Massachusetts Department of Environmental Protection**Bureau of Resource Protection - Wetlands

#### WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:		
MassDFP File Number		
Massber The Namber		
Document Transaction Number		
Millis		
City/Tours		
City/Town		

#### Important:

When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

Α.	General	Informati	on	

Water Street		Millis	02054
a. Street Address		b. City/Town	c. Zip Code
Latitude and Longit	ude:	42° 10' 34.7"	-71° 21' 5.1"
		d. Latitude	e. Longitude
Map 52 f. Assessors Map/Plat N	umbor	Lot 9 g. Parcel /Lot Numb	or .
i. Assessors Map/Flat N	umber	g. Faicei /Lot Numb	ici
Applicant:			
James		McKay	
a. First Name		b. Last Name	
	partment of Public Work	S	
c. Organization			
900 Main Street			
d. Street Address		N 4 A	00054
Millis e. City/Town		MA f. State	02054 g. Zip Code
508-376-5424	508-376-2442	jmckay@millisma.go	- ·
h. Phone Number	i. Fax Number	j. Email Address	5 <b>v</b>
		b. Last Name	
a. First Name  c. Organization		b. Last Name	
c. Organization d. Street Address			a Zin Codo
c. Organization d. Street Address		b. Last Name	g. Zip Code
c. Organization  d. Street Address  e. City/Town	i. Fax Number		g. Zip Code
c. Organization  d. Street Address  e. City/Town  h. Phone Number		f. State	g. Zip Code
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if a		f. State	g. Zip Code
c. Organization  d. Street Address  e. City/Town  h. Phone Number  Representative (if a		f. State j. Email address	g. Zip Code
c. Organization  d. Street Address e. City/Town  h. Phone Number  Representative (if a Tyler a. First Name Kleinfelder		f. State j. Email address  Bernier	g. Zip Code
c. Organization  d. Street Address  e. City/Town  h. Phone Number  Representative (if a Tyler a. First Name Kleinfelder c. Company	any):	f. State  j. Email address  Bernier	g. Zip Code
c. Organization  d. Street Address  e. City/Town  h. Phone Number  Representative (if a Tyler a. First Name  Kleinfelder c. Company  One Beacon Street	any):	f. State  j. Email address  Bernier b. Last Name	g. Zip Code
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if a Tyler a. First Name Kleinfelder c. Company One Beacon Street d. Street Address Boston	any):	f. State  j. Email address  Bernier b. Last Name	02108
c. Organization  d. Street Address  e. City/Town  h. Phone Number  Representative (if a Tyler a. First Name Kleinfelder c. Company One Beacon Street d. Street Address Boston e. City/Town	any):	f. State  j. Email address  Bernier b. Last Name  MA f. State	02108 g. Zip Code
c. Organization  d. Street Address  e. City/Town  h. Phone Number  Representative (if a Tyler a. First Name  Kleinfelder c. Company  One Beacon Street d. Street Address  Boston e. City/Town  617-498-4772	, Suite 800	f. State  j. Email address  Bernier b. Last Name  MA f. State tbernier@kleinfelde	02108 g. Zip Code
c. Organization  d. Street Address  e. City/Town  h. Phone Number  Representative (if a Tyler a. First Name Kleinfelder c. Company One Beacon Street d. Street Address  Boston e. City/Town 617-498-4772	any):	f. State  j. Email address  Bernier b. Last Name  MA f. State	02108 g. Zip Code
c. Organization  d. Street Address  e. City/Town  h. Phone Number  Representative (if a Tyler a. First Name Kleinfelder c. Company One Beacon Street d. Street Address  Boston e. City/Town 617-498-4772 h. Phone Number	, Suite 800	f. State  j. Email address  Bernier b. Last Name  MA f. State tbernier@kleinfelder j. Email address	02108 g. Zip Code
c. Organization  d. Street Address  e. City/Town  h. Phone Number  Representative (if a Tyler a. First Name Kleinfelder c. Company One Beacon Street d. Street Address Boston e. City/Town 617-498-4772 h. Phone Number	nny):  , Suite 800  i. Fax Number  d (from NOI Wetland Fe	f. State  j. Email address  Bernier b. Last Name  MA f. State tbernier@kleinfelder j. Email address	02108 g. Zip Code



## Massachusetts Department of Environmental Protection Bureau of Resource Protection - Wetlands WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:			
	MassDEP File Number		
	Document Transaction Number		
	Millis		
	City/Town		

Α.	General Information (continued)						
6.	eneral Project Description: stall activated carbon filters and associated facilities to treat six per- and poly-fluoroalkyl						
		substances (PFAS6) at the Millis D'Angelis Water Treatment Plant					
7a.	a. Project Type Checklist: (Limited Project Types see Section A. 7b.)						
	1. Single Family Home	2. Residential Subdivision					
	3.   Commercial/Industrial	4. Dock/Pier					
	5. 🛛 Utilities	6. Coastal engineering Structure					
	7. Agriculture (e.g., cranberries, forestry)	8. Transportation					
	9.  Other						
7b.	Is any portion of the proposed activity eligible to be Restoration Limited Project) subject to 310 CMR 10						
	1. Yes No No If yes, describe which limited project applies to this project. (See 310 C 10.24 and 10.53 for a complete list and description of limited project types.)						
	2. Limited Project Type						
If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Project Checklist and Signed Certification.							
8.	Property recorded at the Registry of Deeds for:						
	Norfolk County						
	a. County Bk 694	b. Certificate # (if registered land) Pg 527					
	c. Book	d. Page Number					
В.	<b>Buffer Zone &amp; Resource Area Impa</b>	acts (temporary & permanent)					
1.	Buffer Zone Only − Check if the project is locate     Vegetated Wetland, Inland Bank, or Coastal Be     Vegetated Wetland, Inland Bank, o						
2.	Vegetated Wetland, Inland Bank, or Coastal Resource Area.  Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).						
	Check all that apply below. Attach narrative and any project will meet all performance standards for each						

standards requiring consideration of alternative project design or location.



For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

3.

wpaform3.doc • rev. 6/18/2020

## **Massachusetts Department of Environmental Protection**Bureau of Resource Protection - Wetlands

#### WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

rovided by MassDEP:			
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	Millis		
	City/Town		

#### B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Resource Area		Size of Proposed Alteration	Proposed Replacement (if any)		
a. 🗌	Bank	1. linear feet	2. linear feet		
b. 🗌	Bordering Vegetated Wetland	1. square feet	2. square feet		
c. 🗌	Land Under Waterbodies and	1. square feet	2. square feet		
	Waterways	3. cubic yards dredged			
Resour	ce Area	Size of Proposed Alteration	Proposed Replacement (if any)		
d. 🔲	Bordering Land				
	Subject to Flooding	1. square feet	2. square feet		
		3. cubic feet of flood storage lost	4. cubic feet replaced		
е. 🗌	Isolated Land				
	Subject to Flooding	1. square feet			
		2. cubic feet of flood storage lost	3. cubic feet replaced		
f.	Riverfront Area	1. Name of Waterway (if available) - spec	cify coastal or inland		
2.	Width of Riverfront Area (	check one):			
	25 ft Designated De	ensely Developed Areas only			
☐ 100 ft New agricultural projects only					
	200 ft All other proje	ects			
3.	3. Total area of Riverfront Area on the site of the proposed project:				
4. Proposed alteration of the Riverfront Area:			·		
			0		
a. t	otal square feet	b. square feet within 100 ft.	c. square feet between 100 ft. and 200 ft.		
5. <b>l</b>	Has an alternatives analysis	s been done and is it attached to thi	is NOI? Yes No		
6. \	Was the lot where the activ	ty is proposed created prior to Aug	ust 1, 1996? ☐ Yes ☐ No		
☐ Coa	☐ Coastal Resource Areas: (See 310 CMR 10.25-10.35)				

**Note:** for coastal riverfront areas, please complete **Section B.2.f**. above.



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Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

rovided by MassDEP:			
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	Millis City/Town		

#### B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users:
Include your
document
transaction
number
(provided on your
receipt page)
with all
supplementary
information you
submit to the
Department.

4.

5.

Resource Area		Size of Proposed Alteration	Proposed Replacement (if any)	
а. 🗌	Designated Port Areas	Indicate size under Land Under the Ocean, below		
b. 🗌	Land Under the Ocean	square feet     cubic yards dredged		
с. 🗌	Barrier Beach		aches and/or Coastal Dunes below	
d. 🗌	Coastal Beaches	1. square feet	2. cubic yards beach nourishment	
е. 🗌	Coastal Dunes	1. square feet	2. cubic yards dune nourishment	
		Size of Proposed Alteration	Proposed Replacement (if any)	
f.	Coastal Banks Rocky Intertidal	1. linear feet		
h.	Shores Salt Marshes Land Under Salt	square feet     square feet	2. sq ft restoration, rehab., creation	
	Ponds	square feet     cubic yards dredged		
j. 📙	Land Containing Shellfish	1. square feet		
k. 🗌	Fish Runs		nks, inland Bank, Land Under the er Waterbodies and Waterways,	
I. 🗌	Land Subject to Coastal Storm Flowage	cubic yards dredged     square feet		
Restoration/Enhancement If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.				
a. squar	re feet of BVW	b. square feet of	Salt Marsh	
Project Involves Stream Crossings				
a. numb	per of new stream crossings	b. number of repl	acement stream crossings	



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### WPA Form 3 – Notice of Intent

Prov	ided by MassDEP:
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	Millis
	City/Town

Ma	assachusetts Wetlands Protection Act M.G.	L. c. 131, §40	Millis City/Town			
C.	C. Other Applicable Standards and Requirements					
	☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).					
Stı	reamlined Massachusetts Endangered Spec	ies Act/Wetlands	<b>Protection Act Review</b>			
1.	Is any portion of the proposed project located in <b>E</b> st the most recent Estimated Habitat Map of State-Li Natural Heritage and Endangered Species Progra Massachusetts Natural Heritage Atlas or go to <a href="http://maps.massgis.state.ma.us/PRI_EST_HAB/v">http://maps.massgis.state.ma.us/PRI_EST_HAB/v</a>	sted Rare Wetland V m (NHESP)? To viev	Vildlife published by the			
	a. Yes No If yes, include proof of n	nailing or hand deli	very of NOI to:			
	MassGIS 2017 b. Date of map  Natural Heritage and E Division of Fisheries a 1 Rabbit Hill Road Westborough, MA 015	nd Wildlife	Program			
	If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); OR complete Section C.2.f, if applicable. If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).					
	c. Submit Supplemental Information for Endangere	ed Species Review*				
	1. Percentage/acreage of property to be	altered:				
	(a) within wetland Resource Area	percentage/acreage				
	(b) outside Resource Area	percentage/acreage				
	2. Assessor's Map or right-of-way plan of	fsite				
2.	Project plans for entire project site, including wetlands jurisdiction, showing existing and propos tree/vegetation clearing line, and clearly demarcate	ed conditions, existir				
	(a) Project description (including description buffer zone)	on of impacts outsid	e of wetland resource area &			

Photographs representative of the site

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<sup>\*</sup> Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see <a href="https://www.mass.gov/maendangered-species-act-mesa-regulatory-review">https://www.mass.gov/maendangered-species-act-mesa-regulatory-review</a>).

Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

<sup>\*\*</sup> MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.



3.

## **Massachusetts Department of Environmental Protection**Bureau of Resource Protection - Wetlands

### WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Prov	ided by MassDEP:
•	MassDEP File Number
	Document Transaction Number
	Millis
	City/Town

#### C. Other Applicable Standards and Requirements (cont'd)

(c) MESA filing fee (fee information availa <a href="mailto:a-mesa-project-review">a-mesa-project-review</a> ).  Make check payable to "Commonwealth of Ma above address	ble at <a href="https://www.mass.gov/how-to/how-to-file-for-ssachusetts">https://www.mass.gov/how-to/how-to-file-for-ssachusetts</a> - NHESP" and <i>mail to NHESP</i> at
Projects altering 10 or more acres of land, also sub	omit:
(d) Vegetation cover type map of site	
(e) Project plans showing Priority & Estima	ated Habitat boundaries
(f) OR Check One of the Following	
https://www.mass.gov/service-details/e	MESA exemption applies. (See 321 CMR 10.14, exemptions-from-review-for-projectsactivities-inent to NHESP if the project is within estimated d 10.59.)
2. Separate MESA review ongoing.	a. NHESP Tracking # b. Date submitted to NHESP
<ol> <li>Separate MESA review completed. Include copy of NHESP "no Take" determit with approved plan.</li> </ol>	ermination or valid Conservation & Management
For coastal projects only, is any portion of the prop ine or in a fish run?	osed project located below the mean high water
a. Not applicable – project is in inland resource	area only b.  Yes No
If yes, include proof of mailing, hand delivery, or ele	ectronic delivery of NOI to either:
South Shore - Cohasset to Rhode Island border, and the Cape & Islands:	North Shore - Hull to New Hampshire border:
Division of Marine Fisheries - Southeast Marine Fisheries Station Attn: Environmental Reviewer 836 South Rodney French Blvd. New Bedford, MA 02744 Email: dmf.envreview-south@mass.gov	Division of Marine Fisheries - North Shore Office Attn: Environmental Reviewer 30 Emerson Avenue Gloucester, MA 01930 Email: dmf.envreview-north@mass.gov
Also if yes, the project may require a Chapter 91 lic please contact MassDEP's Boston Office. For coas MassDEP's Southeast Regional Office.	cense. For coastal towns in the Northeast Region, stal towns in the Southeast Region, please contact
c. Is this an aquaculture project?	d. 🗌 Yes 🛛 No
If yes, include a copy of the Division of Marine Fish	neries Certification Letter (M.G.L. c. 130, § 57).

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## **Massachusetts Department of Environmental Protection**Bureau of Resource Protection - Wetlands

#### WPA Form 3 - Notice of Intent

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rov	rided by MassDEP:
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#### C. Other Applicable Standards and Requirements (cont'd)

	4.	Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?
Online Users: Include your document		a.   Yes   No   If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations).   Note: electronic filers click on Website.
transaction number		b. ACEC
(provided on your receipt page) with all	5.	Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?
supplementary information you		a. 🗌 Yes 🔯 No
submit to the Department.	6.	Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?
		a. 🗌 Yes 🗵 No
	7.	Is this project subject to provisions of the MassDEP Stormwater Management Standards?
		a. Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:
		<ol> <li>Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)</li> </ol>
		2. A portion of the site constitutes redevelopment
		3. Proprietary BMPs are included in the Stormwater Management System.
		b. No. Check why the project is exempt:
		1. Single-family house
		2. Emergency road repair
		3. Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.
	D.	Additional Information
		This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).
		Applicants must include the following with this Notice of Intent (NOI). See instructions for details.
		<b>Online Users:</b> Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.
		1. Subject to the constraint of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative

to the boundaries of each affected resource area.

2.



# Massachusetts Department of Environmental Protection Bureau of Resource Protection - Wetlands WPA Form 3 - Notice of Intent Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Prov	rided by MassDEP:
	MassDEP File Number
	Document Transaction Number
	Millis
	City/Town

#### D.

D.	Add	itional Information (cont'd)			
	3. 🔀	Identify the method for BVW and other resormed Data Form(s), Determination of Applicand attach documentation of the method	cability, Order of Resource		
	4. 🛛	List the titles and dates for all plans and oth	ner materials submitted with	n this NOI.	
	D'A	ungelis Water Treatment Plant PFAS Upgrad	les		
		lan Title			
		infelder	0' 1 10'		
		repared By	c. Signed and Stamped by		
		otember 2021 inal Revision Date	1"=30' e. Scale		
	u. i	inal Revision Date	e. Scale		
	f. Ad	dditional Plan or Document Title		g. Date	
	5.	If there is more than one property owner, pllisted on this form.	lease attach a list of these	property owners not	
	6.	Attach proof of mailing for Natural Heritage	and Endangered Species	Program, if needed.	
	7.	Attach proof of mailing for Massachusetts D	Division of Marine Fisheries	s, if needed.	
	8. 🛛	Attach NOI Wetland Fee Transmittal Form			
	9. 🛛	Attach Stormwater Report, if needed.			
E.	Fees				
	1.	Fee Exempt: No filing fee shall be assessed of the Commonwealth, federally recognized authority, or the Massachusetts Bay Transp	Indian tribe housing author	•	
		nts must submit the following information (in	addition to pages 1 and 2	of the NOI Wetland	
	N/A		N/A		
		pal Check Number	3. Check date		
	N/A		N/A		
		Check Number	5. Check date		
	N/A		N/A		
	6. Payor	name on check: First Name	7. Payor name on check: I	Last Name	



#### Massachusetts Department of Environmental Protection

Bureau of Resource Protection - Wetlands

#### WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number Millis

City/Town

#### F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

lang. mayly	10/15/2021	
1. Signature of Applicant	2. Date	
3. Signature of Property Owner (if different)	4. Date	
3. Signature of Property Owner (it different)	10/15/2021	
5. Signature of Representative (if any)	6. Date	

#### For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

#### For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

#### Other

If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.



#### Massachusetts Department of Environmental Protection

Bureau of Resource Protection - Wetlands

#### **NOI Wetland Fee Transmittal Form**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

# Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.





Α.	Applicant Inf	ormation		
1.	Location of Project:			
	Water Street		Millis	
	a. Street Address		b. City/Town	
	N/A		N/A	
	c. Check number		d. Fee amount	
2.	Applicant Mailing A	ddress:		
	James		McKay	
	a. First Name		b. Last Name	
	Town of Millis - Dep	partment of Public Works		
	c. Organization			
	900 Main Street			
	d. Mailing Address			
	Millis		MA	02054
	e. City/Town		f. State	g. Zip Code
	978-658-4481	978-658-2003	mwoods@wilmingtonma.g	OV
	h. Phone Number	i. Fax Number	j. Email Address	
3.	Property Owner (if	different):		
	Same			
	a. First Name		b. Last Name	
	c. Organization			
	d. Mailing Address			
	e. City/Town		f. State	g. Zip Code
	h. Phone Number	i. Fax Number	j. Email Address	

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

#### **B.** Fees

Fee should be calculated using the following process & worksheet. *Please see Instructions before filling out worksheet.* 

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

**Step 4/Subtotal Activity Fee:** Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

**Step 6/Fee Payments:** To calculate the state share of the fee, divide the total fee in half and subtract \$12.50. To calculate the city/town share of the fee, divide the total fee in half and add \$12.50.



#### **Massachusetts Department of Environmental Protection**

Bureau of Resource Protection - Wetlands

#### **NOI Wetland Fee Transmittal Form**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

В.	Fees (continued)			
	Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
		Step 5/To	otal Project Fee	:
		Step 6/	Fee Payments:	
		Total	Project Fee:	Municipal Exemption a. Total Fee from Step 5
		State share	of filing Fee:	Municipal Exemption b. 1/2 Total Fee less \$12.50
		City/Town share	e of filling Fee:	Municipal Exemption c. 1/2 Total Fee plus \$12.50

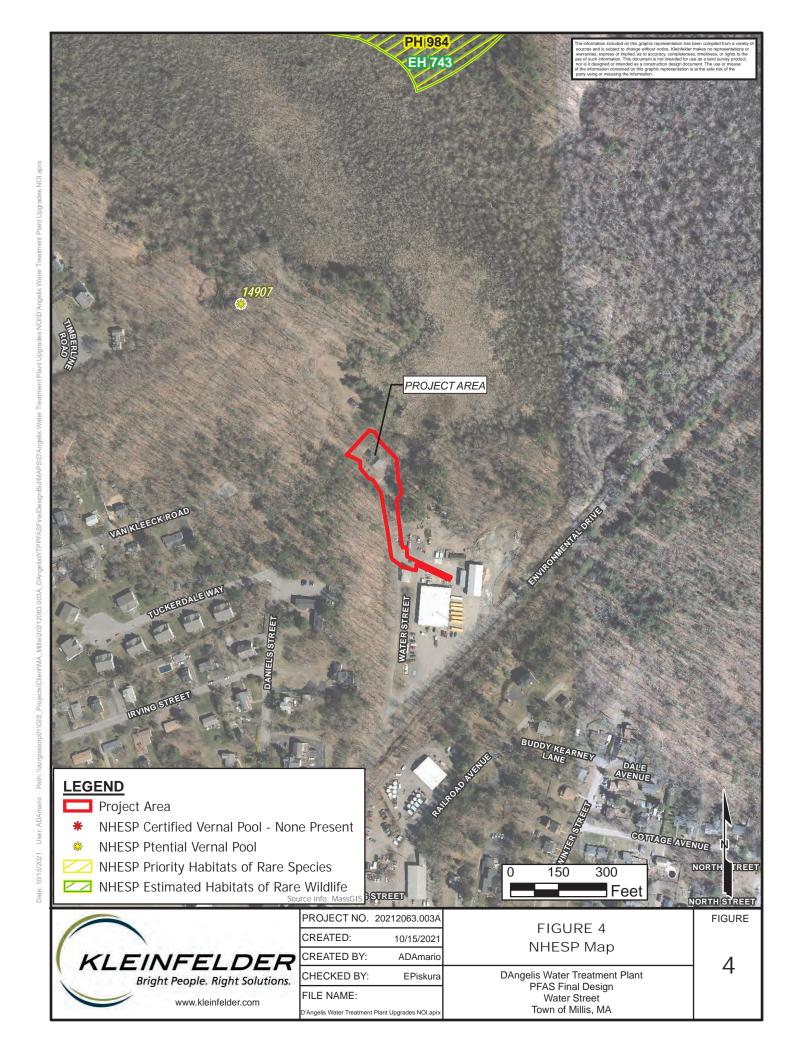
#### C. Submittal Requirements

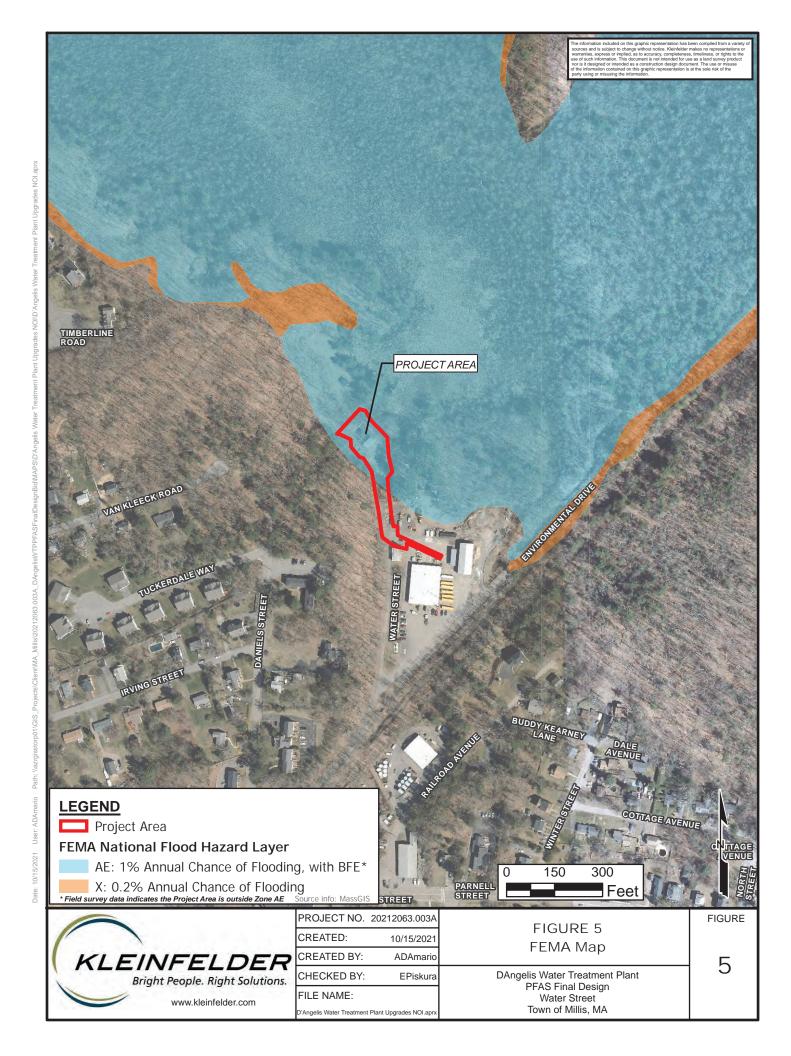
a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection Box 4062 Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

**To MassDEP Regional Office** (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)







## ATTACHMENT A NOI Narrative



#### Attachment A – Notice of Intent Narrative

This Notice of Intent (NOI) is filed pursuant to the Massachusetts Wetlands Protection Act (WPA) (MGL Chapter 131, Section 40) and its implementing regulations (310 CMR 10.00). This narrative presents wetland resource areas associated with the Project area, a description of the proposed work, proposed mitigation measures, and how the Project meets the performance standards of the WPA regulations. Refer to the accompanying Project plans included as Attachment D for a plan layout and details of the Project component

#### Introduction

The Town of Millis (Millis) operates a water system with six overburden groundwater wells and four treatment plants, serving approximately 8,600 residential customers. The Massachusetts Department of Environmental Protection (MassDEP) recently adopted a drinking water standard limiting six per- and polyfluoroalkyl substances (PFAS) levels to no more than 20 nanograms per liter (ng/L), and as part of the new drinking water regulations, all public water systems are required to sample for PFAS levels. In August 2020 testing at the D'Angelis Water Treatment Plant (D'Angelis WTP), located on Water Street adjacent to the Transfer Station and serving Wells 1 and 2 in Millis, indicated PFAS levels over 20 ng/L. This reading required the plant to be taken offline. PFAS has also been detected in the remaining four wells, and in some of those wells the levels are fluctuating or rising. With the D'Angelis WTP offline, Millis may have difficulty meeting demand if any other town wells need to be taken out of service for maintenance or repair, or if PFAS levels in those wells exceed the Massachusetts Maximum Contaminant Level (MCL). In addition, Millis may experience a supply deficit without Wells 1 and 2 online based on near term future demand from a recently approved development.

The Town of Millis Department of Public Works (DPW) has conducted pilot testing and a thorough site investigation to obtain the most effective treatment for removing PFAS from drinking water with the least environmental impact. The DPW proposes to construct a new building housing granular activated carbon (GAC) filters and associated infrastructure at the existing D'Angelis WTP for treatment of public drinking water with levels of PFAS that exceed the new 20 ng/L MCL.

Portions of the land near the Project area contain Bordering Vegetated Wetlands (BVW), a resource area subject to the jurisdiction of the WPA. Proposed work for the Project will occur only in the 100-foot Buffer Zone of the BVW. The Project meets or exceeds all performance standards for Buffer Zone under the WPA. Portions of the Project area are also shown on the Flood Insurance Rate Map (FIRM) as located within Zone AE (100-year floodplain, regulated as Bordering Land Subject to Flooding [BLSF]). However, within the Project area, base flood elevation (BFE) is mapped as 122 feet NAVD88 and recently the DPW obtained survey information collect by a Professional Land Surveyor (PLS) registered in the Commonwealth of Massachusetts that shows the Limit of Disturbance for this Project is located above BFE. More information on the position of the project footprint relative to Zone AE is provided below.

#### **Site Description**

The Project area is located on one parcel of land at the end of Water Street in Millis, Massachusetts. Work proposed under the scope of this NOI will only occur in the southeastern portion of the parcel. The Project area currently contains the former animal shelter building, now used by DPW for storage, and a storage building. The Project area is bounded by BVW to the east, Water Street and the existing D'Angelis WTP to the south, and vegetated upland to the north and a residential neighborhood to the west. Refer to Figure 1 for a Tax Parcel map of the Project area, and Figures 2 and 3 for a USGS map and aerial map of the Project area.

According to the most recently available data provided by the Massachusetts Natural Heritage and Endangered Species Program (NHESP), no Priority Habitats for Rare Species or Estimated Habitats for



Rare Wildlife have been mapped in the vicinity of the Project area. No certified or potential vernal pools have been mapped in the Project area (Figure 4). The Project Area is not located within or near an Area of Critical Environmental Concern (ACEC). According to the Massachusetts Department of Environmental Protection (DEP), the Project area is not located within an Outstanding Resource Water area, but it designated as a Zone I and Zone II Wellhead Protection Area. According to the Natural Resources Conservation Service (NRCS) soil survey, soils in the Project area are mapped as Merrimac fine sandy loam, Hinckley loamy sand, and Freetown muck.

#### **Wetland Resource Areas**

Wetland Resource areas in or near the Project Area were identified and delineated by environmental scientists from Basbanes Wetland Consulting on April 14, 2021, in accordance with methods developed by the DEP and U.S. Army Corps of Engineers. Resource areas are shown on the accompanying Project plans and wetland data forms are included in Attachment C. One BVW was delineated in the Project Area. BVW is defined under the WPA Regulations (310 CMR 10.00) as: "freshwater wetlands that border on creeks, rivers, streams, ponds, and lakes." The boundary of a BVW is determined by the presence of 50 percent or more of wetland indicator plants and saturated or inundated conditions.

The delineated wetland is located east of the Project Area and is part of an extensive wetland system associated with Bogastow Brook, a perennial watercourse running east/west approximately 500 feet east of the Project Area. Dominant vegetation within the wetland includes red maple, highbush blueberry, spicebush, witch hazel, and skunk cabbage. The wetland was delineated with flags 1A through 56A (See Project plans). The wetland is regulated as BVW under the WPA.

A 100-foot Buffer Zone extends horizontally outward from the BVW boundary described above, as defined in 310 CMR 10.02(2)(b). The Buffer Zone is not considered a resource area under the WPA, but areas within the Buffer Zone are under the jurisdiction of the issuing authority. Millis has an additional wetlands protection bylaw preventing structures within the inner 50-foot Buffer Zone from the edge of a wetland resource. Within the Project area, the Buffer Zone of the wetland contains steep slopes, gravel areas, and two existing buildings.

The FIRM for the area indicates the Project is within as within Zone AE, regulated as BLSF, with an elevation of 122 feet NAVD88. However, a civil survey conducted within the Project area in April 2021 shows that all Project impacts occur above an elevation of approximately 128 feet NAVD88. The Project Area is outside of the 100-year floodplain and therefore not subject to regulation under WPA. DPW is in the process of applying for a Letter of Map Amendment from the Federal Emergency Management Agency (FEMA), indicating they concur that the Project Area is located outside of Zone AE and BLSF.

#### **Proposed Activities**

The project includes installation of four (4) 20,000 lb. GAC filters at the D'Angelis WTP, which will require additional building footprint to accommodate the infrastructure. The existing WTP building is situated with a steeply sloped area east of the building, a road immediately north, and the Millis Transfer Station to the west, making expansion of that building infeasible. The DPW proposes to construct a new building on a DPW-owned parcel located at the end of Water Street, adjacent to the existing D'Angelis WTP. An existing storage building on the parcel, covering approximately 1,600 square feet (sqft), will be demolished and the new building housing the granular activated carbon filters, 2,950 sqft, will be built in its place. A second building, the former animal shelter that is now used for storage will also be demolished, covers approximately 480 sqft. Existing paved areas directly around the new building as well as the access road leading to the new building will be reconstructed to provide safe access for vehicles and maintenance personnel. In addition, a new retaining wall will be constructed to replace the retaining wall connected to the animal shelter building. The proposed building footprint is located within the 100-foot Buffer Zone of a BVW, and a portion of the building is located within the Millis 50-foot Buffer Zone.



#### Activities Within Buffer Zone

Project work within the Buffer Zone will include demolition of the existing storage and animal shelter buildings, as well as reconstruction of existing paved areas and installation of a new retaining wall. Because the site is already developed, only minor grading would be performed as needed prior to construction of the new building. All work will take place outside of the BVW, but demolition of the storage building, replacing pavement, and construction of the new building, approximately 14,100 sqft, will be within the 100-foot Buffer Zone as shown on the attached plans in Attachment D. Sedimentation barriers will be placed around the perimeter of the work area to prevent migration of excavated material from entering the BVW.

#### Mitigation

The new building has been sited to reduce impacts to wetland resources to the greatest extent practicable by locating it in a previously disturbed area and replacing an existing building. An erosion and sedimentation control program will be implemented to minimize temporary impacts to wetland resource areas during the construction phase of the project. The program incorporates Best Management Practices (BMPs) specified in guidelines developed by the DEP and the U.S. Environmental Protection Agency (EPA).

Proper implementation of the erosion and sedimentation control program will:

- Minimize exposed soil areas through sequencing and temporary stabilization;
- > Place structures to manage stormwater runoff and erosion; and
- > Establish a permanent vegetative cover or other forms of stabilization as soon as practicable.

#### Non-Structural Practices

Non-structural practices to be used during construction include temporary stabilization, temporary seeding, permanent seeding, pavement sweeping, and dust control. These practices will be initiated as soon as practicable in appropriate areas within the Project Area.

#### **Temporary Stabilization**

Any areas of exposed soil or stockpiles that will remain inactive for more than 14 days will be surrounded by erosion control devices and covered with polyurethane sheeting.

#### **Temporary Seeding**

If conditions allow, a temporary vegetative cover will be established on areas of exposed soils (including stockpiles) that remain unstabilized for a period of more than 60 days. The seeded surfaces will be covered with a layer of straw mulch or bonded fiber matrix as described above. The seed mix shall include a blend of rapid germinating grasses that are indigenous to eastern Massachusetts.

#### **Permanent Seeding**

Upon completion of final grading, any areas not covered by pavement, other forms of stabilization, or other methods of landscaping will be seeded with a native seed mix. The mix will be applied at a rate specified by the manufacturer and will be covered with mulch or bonded fiber matrix as described above.

#### Pavement Sweeping

The interior roads (once paved) and the portion of the street that fronts the Project Area shall be swept as needed during construction. The sweeping program will remove sediment and other contaminants directly from paved surfaces before their release into stormwater runoff. Pavement sweeping has been demonstrated to be an effective initial treatment for reducing pollutant loading into stormwater. A street sweeper shall be



kept at the site or at a nearby location to facilitate this practice. Once construction has been completed, sweeping at the Project Area will occur as required under the Operation and Maintenance Plan.

#### **Dust Control**

The erosion and sediment control program includes provisions to minimize the generation of dust during dry and windy conditions. When necessary, larger areas of exposed soil will be wetted to prevent wind borne transport of fine grained sediment. Enough water shall be applied to wet the upper 0.5 inches of soil. The water will be applied as a fine spray to prevent erosion. A water truck will be kept on the property (or at a nearby location) to facilitate this practice.

#### **Structural Practices**

Structural erosion and sedimentation controls to be used on the Project Area include barriers, catch basin inlet protection, and dewatering filters.

#### **Erosion Control Barriers**

Prior to any ground disturbance, an approved erosion control barrier will be installed at the downgradient limit of work. As construction progresses, additional barriers will be installed around the base of stockpiles and other erosion prone areas. The barriers will be entrenched into the substrate to prevent underflow.

If sediment has accumulated to a depth which impairs proper functioning of the barrier, it will be removed by hand or by machinery operating upslope of the barriers. This material will be either reused in the Project Area or disposed of at a suitable offsite location. Any damaged sections of the barrier will be repaired or replaced immediately upon discovery.

#### Catch Basin Inlet Protection

The inlets of existing and proposed catch basins will be protected from sediment inflow during the work period by surrounding them with a barrier of staked straw bales or by installing Silt Sacks®. If straw bales are used, a layer of non-woven filter fabric shall be placed beneath the grate of each basin. If sediment has collected behind the barrier or in the Silt Sack® to a point where it impairs proper functioning, it will be removed and will be either reused onsite or disposed of at a suitable offsite location.

#### Dewatering Filters

If necessary, sediment laden water that collects in trenches or excavated areas will be pumped into straw bale basins or filter bags. The basins will consist of a ring of staked straw bales overlain by non-woven geotextile filter fabric and crushed stone. Discharge water will be pumped into the basin and allowed to drain through the fabric onto relatively flat stabilized surfaces. Dewatering filter bags may be used in place of straw bale basins. The bags will be placed on relatively flat terrain, free of brush and stumps, to avoid ruptures and punctures. A maximum of one six-inch discharge hose will be allowed per filter bag. To help prevent punctures, geotextile fabric will be placed beneath the filter bag when used in wooded locations. Unattended filter bags will be encircled with a straw bale and silt fence barrier.

All dewatering structures will be placed as far away from wetland resources as possible. Filter bags used during construction will be bundled and removed for proper disposal.

#### **Stormwater Management**

Runoff generated from impervious surfaces will be collected and managed in accordance with the DEP Stormwater policies in significant improvement to existing conditions. The proposed Project will improve existing conditions within the Project Area by constructing a stormwater management system that includes measures to provide groundwater recharge, attenuate peak flows and provide water quality treatment. Full details on the system (including supporting calculations) are included in the accompanying Stormwater Management Report (Attachment E).



Compliance with the 10 stormwater management standards cited in Section 310 CMR 10.05(6)(k) of the WPA Regulations is evaluated in the Regulatory Compliance section of the Stormwater Management Report.

#### **Regulatory Compliance**

As demonstrated below, the Project work fully complies with and exceeds applicable performance standards contained in the WPA for work in the 100-foot Buffer Zone to BVW. Compliance with each of the applicable performance standards is described in more detail below.

The Buffer Zone is not a resource area and, therefore, work within a Buffer Zone is not governed by specific regulatory performance standards. In general, work within a Buffer Zone is permissible when said work has been designed, or can be conditioned, such that there will be no impact on the downgradient wetland resource area(s) being buffered. As stated in 310 CMR 10.53(1) of the WPA Regulations:

For work in Buffer Zone subject to review under 310 CMR 10.02(2)(b)3., the Issuing Authority shall impose conditions to protect the interests of the Act identified for the adjacent Resource Area... The issuing authority may consider the characteristics of the Buffer Zone, such as the presence of steep slopes, that may increase the potential for adverse impacts on Resource Areas. Conditions may include limitations on the scope and location of work in the Buffer Zone as necessary to avoid alteration of Resource Areas. The Issuing Authority may require erosion and sedimentation controls during construction, a clear limit of work, and the preservation of natural vegetation adjacent to the Resource Area and/or other measures commensurate with the scope and location of work with the Buffer Zone to protect the interests of the Act.

The Project has been designed to address these considerations. Measures have been incorporated into the Project design to ensure that work will be done in a manner that prevents impacts to downgradient wetland resources. A clear limit of work will be identified and erosion and sedimentation control areas will be installed in the Project Area. Temporary disturbance in vegetated areas of Buffer Zone will be restored in place and seeded with a native seed mix.

The Applicant respectfully requests that the Millis Conservation Commission find these measures adequately protective of the interests identified in the WPA and issue an Order of Conditions approving the work described in this NOI and shown on the accompanying plans.



## ATTACHMENT B Abutter Information

#### **Notification to Abutters**

#### By Hand Delivery, Certified Mail (return receipt requested), or Certificates of Mailing

This is a notification required by law. You are receiving this notification because you have been identified as the owner of land abutting another parcel of land for which certain activities are proposed. Those activities require a permit under the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40).

In accordance with the second paragraph of the Massachusetts Wetlands Protection Act, and 310 CMR 10.05(4)(a) of the Wetlands Regulations, you are hereby notified that:

A. A Notice of Intent was filed with the Millis Conservation Commission on October 18, 2021 seeking permission to remove, fill, dredge, or alter an area subject to protection under M.G.L. c. 131 §40. The following is a description of the proposed activity/activities:

Install activated carbon filters and associated facilities to treat six per- and poly-fluoroalkyl substances (PFAS) at the Millis D'Angelis Water Treatment Plant. Work includes demolishing two existing storage buildings and constructing a new building to house the filters. No wetland resources will be impacted, however work will occur in the 100-foot Buffer Zone of a Bordering Vegetated Wetland.

- B. The name of the applicant is: Town of Millis Department of Public Works.
- C. The address of the land where the activity is proposed is: Water Street, Map 52 Lot 9
- D. Copies of the Notice of Intent may be examined or obtained at the office of the Millis Conservation Commission, located at 900 Main Street, Millis, MA 02054. The regular business hours of the Commission are 8:30am to 4:30pm Monday through Thursday and 8:30am to 12:30pm Friday, and the Commission may be reached at 508-376-7045 ext. 126.
- E. Copies of the Notice of Intent may be obtained from the applicant's representative by calling Tyler Bernier at 617-498-4772. An administrative fee may be applied for providing copies of the NOI and plans.
- F. Information regarding the date, time, and location of the public hearing regarding the Notice of Intent may be obtained from the Millis Conservation Commission. Notice of the public hearing will be published at least five business days in advance, in the local newspaper.

Notification provided pursuant to the above requirement does not automatically confer standing to the recipient to request Departmental Action for the underlying matter. See 310 CMR 10.05(7)(a)4.





#### Parcel 52-009

Millis, MA

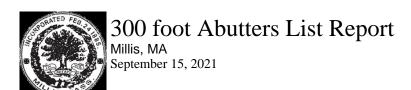


September 15, 2021 0 558 1116 1

www.cai-tech.com



Data shown on this map is provided for planning and informational purposes only. The municipality and CAl Technologies are not responsible for any use for other purposes or misuse or misrepresentation of this map.



#### **Subject Property:**

Parcel Number: 0052-0009-0000 CAMA Number: 0052-0009-0000

Property Address: ISLAND RD

Mailing Address: TOWN OF MILLIS

ISLAND RD

**MILLIS. MA 02054** 

Δ	h	• •	++	Δ	rs	•

Parcel Number: 0016-0054-0000

CAMA Number: 0016-0054-0000 Property Address: ISLAND RD

Mailing Address: MILLER CHARLES R & SIRIPHAN S

89 ISLAND RD MILLIS, MA 02054

Parcel Number: 0019-0067-0000

CAMA Number: 0019-0067-0000 Property Address: 102 VAN KLEECK RD Mailing Address: DRISCOLL PATRICIA H

102 VAN KLEECK RD MILLIS, MA 02054

Parcel Number: 0019-0068-0000 CAMA Number: 0019-0068-0000

Property Address: VAN KLEECK RD

TOWN OF MILLIS Mailing Address:

900 MAIN ST MILLIS, MA 02054

Parcel Number: 0019-0114-0000

CAMA Number: 0019-0114-0000

Property Address: 103 VAN KLEECK RD

Mailing Address: HINKLEY COLLIN & CARLSON KIMBERLY

103 VAN KLEECK RD MILLIS, MA 02054

Parcel Number: 0019-0116-0000

CAMA Number: 0019-0116-0000 Property Address: VAN KLEECK RD Mailing Address: TOWN OF MILLIS

> 900 MAIN ST MILLIS, MA 02054

Parcel Number: 0019-0118-0000

CAMA Number: 0019-0118-0001

Property Address: 0 TUCKERDALE WAY

Mailing Address: TUCKERDALE LLC

**CONDO MAIN** CONDO MAIN.

Parcel Number: 0019-0118-0000

CAMA Number: 0019-0118-000A Property Address: 1 TUCKERDALE WAY Mailing Address: LEVIN ANDREY A & JULIA

1 TUCKERDALE WAY MILLIS, MA 02054

Parcel Number:

0019-0118-0000 0019-0118-000B

CAMA Number: Property Address: 2 TUCKERDALE WAY Mailing Address: ALEXANDRA M SANCHEZ

2 TUCKERDALE WAY MILLIS, MA 02054

Parcel Number: CAMA Number: 0019-0118-0000

0019-0118-000C Property Address: 3 TUCKERDALE WAY Mailing Address: HARDIN JANE M REALTY TR

3 TUCKERDALE WAY MILLIS, MA 02054

Parcel Number: CAMA Number:

0019-0118-0000 0019-0118-000D

Mailing Address: ENGLISH JORDAN M & REILLY MEGAN

4 TUCKERDALE WAY

MILLIS, MA 02054

Property Address: 4 TUCKERDALE WAY



Parcel Number:

#### 300 foot Abutters List Report

Millis, MA September 15, 2021

Parcel Number: 0019-0118-0000 CAMA Number:

0019-0118-000E

Property Address: 6 TUCKERDALE WAY

0019-0118-0000

CAMA Number: 0019-0118-000F

Property Address: 5 TUCKERDALE WAY

Parcel Number: 0019-0118-0000 CAMA Number: 0019-0118-000G

Property Address: 11 TUCKERDALE WAY

Parcel Number: 0019-0118-0000 CAMA Number: 0019-0118-000H

Property Address: 12 TUCKERDALE WAY

Parcel Number: 0019-0118-0000

CAMA Number: 0019-0118-000 Property Address: 13 TUCKERDALE WAY

Parcel Number: 0019-0118-0000 CAMA Number: 0019-0118-000J

Property Address: 14 TUCKERDALE WAY

Parcel Number: 0019-0118-0000

CAMA Number: 0019-0118-000K Property Address: 7 TUCKERDALE WAY

Parcel Number: 0019-0118-0000

CAMA Number: 0019-0118-000L

Property Address: 8 TUCKERDALE WAY

Parcel Number: 0019-0118-0000 CAMA Number: 0019-0118-000M

Property Address: 9 TUCKERDALE WAY

Parcel Number: 0019-0118-0000

CAMA Number: 0019-0118-000N

Property Address: 10 TUCKERDALE WAY

Parcel Number: 0019-0118-0000

CAMA Number: 0019-0118-000O

Property Address: 15 TUCKERDALE WAY

Parcel Number: 0019-0118-0000 CAMA Number: 0019-0118-000P

9/15/2021

Property Address: 16 TUCKERDALE WAY

ROBERT J JACKSON CLAIRE W Mailing Address:

**JACKSON** 

**6 TUCKERDALE WAY** MILLIS, MA 02054

Mailing Address: MARK FRANUSIAK NICOLE FRANUSIAK

> **5 TUCKERDALE WAY** MILLIS, MA 02054

Mailing Address: WASSELLEY MILAD & NASHED HEND A.

11 TUCKERDALE WAY MILLIS, MA 02054

Mailing Address: HIRSCHENHOFER KURT S

12 TUCKERDALE WAY MILLIS, MA 02054

Mailing Address: TARARA GINA M

13 TUCKERDALE WAY MILLIS, MA 02054

OCONNELL JOANNE M Mailing Address:

14 TUCKERDALE WAY MILLIS, MA 02054

BIXBY LELAND E & BIXBY KAILIN F Mailing Address:

7 TUCKERDALE WAY

MILLIS, MA 02054

Mailing Address: KAM JOSHUA E & MICHELLE A

8 TUCKERDALE WAY MILLIS, MA 02054

Mailing Address: DOHERTY KATHERINE

9 TUCKERDALE WAY MILLIS, MA 02054

Mailing Address: DONAGHEY JR DAVID & DONAGHEY

LINDSEY

10 TUCKERDALE WAY MILLIS, MA 02054

Mailing Address: TARARA MICHAEL R

> 15 TUCKERDALE WAY MILLIS, MA 02054

Mailing Address: **GUPTA, MOHIT** 

> 16 TUCKERDALE WAY MILLIS, MA 02054





#### 300 foot Abutters List Report

Millis, MA September 15, 2021

Parcel Number: CAMA Number:

0019-0154-0000

0019-0154-0000

Property Address: 3-5 IRVING ST Unit 7 Mailing Address: CONDO MAIN

Parcel Number: CAMA Number: 0019-0154-0000

0019-0154-000A

Property Address: 3 IRVING ST

Parcel Number: CAMA Number:

0019-0154-0000

Property Address: 5 IRVING ST

0019-0154-000B

0019-0155-0000

0019-0155-0000 CAMA Number: Property Address: DANIELS ST

Parcel Number:

Parcel Number:

CAMA Number:

0019-0156-0000 0019-0156-0000

Property Address: 57-59 DANIELS ST UNIT Unit 4

Parcel Number:

CAMA Number:

0019-0156-0000 0019-0156-000A

Property Address: 57 DANIELS ST UNIT 1

Parcel Number: CAMA Number:

0019-0156-0000 0019-0156-000B

Property Address: 57 DANIELS ST UNIT 2

Parcel Number:

0019-0156-0000 CAMA Number: 0019-0156-000C

Property Address: 57 DANIELS ST UNIT 3

Parcel Number: CAMA Number: 0019-0156-0000 0019-0156-000D

Property Address: 57 DANIELS ST UNIT 4

Parcel Number:

9/15/2021

0019-0156-0000 CAMA Number: 0019-0156-000E

Property Address: 57 DANIELS ST UNIT 5

Parcel Number: 0019-0156-0000

CAMA Number: 0019-0156-000F Property Address: 57 DANIELS ST UNIT 6

Parcel Number: 0019-0156-0000

CAMA Number: 0019-0156-000G Property Address: 59 DANIELS ST UNIT 1 Mailing Address: SPRING TRILBY & GORDON JAQUELYN

3 IRVING ST MILLIS, MA 02054

Mailing Address: **HOMER JILL A** 

**5 IRVING ST** MILLIS, MA 02054

Mailing Address: TOWN OF MILLIS

900 MAIN ST MILLIS, MA 02054

Mailing Address: CONDO MAIN

Mailing Address: 57 DANIELS STREET LLC

837 NORTH VISTA STREET LOS ANGELES, CA 90046

Mailing Address: REEM PROPERTY LLC

168 E-MAIN ST #A

NORTHBOROUGH, MA 01532

Mailing Address: FATHI HOSSEIN

40 ABERDEEN RD

FRAMINGHAM, MA 01702

Mailing Address:

COLANTROPO CYNTHIA TTEE THE CYNTHIA J. COLANTROPO TRUST

24 FLORISSANT AVE FRAMINGHAM, MA 01701

Mailing Address: EVANS PHILIP G

57 DANIELS ST UNIT 5 MILLIS, MA 02054

Mailing Address: HALLORAN DANIEL R

57 DANIELS ST UNIT 6 MILLIS, MA 02054

Mailing Address: MB/RE RENTALS LLC

19 FIELD RD

**MEDWAY, MA 02053** 



#### 300 foot Abutters List Report

Millis, MA September 15, 2021

Parcel Number: 0019-0156-0000

CAMA Number: 0019-0156-000H

Property Address: 59 DANIELS ST UNIT 2

Parcel Number: 0019-0156-0000

CAMA Number: 0019-0156-000I

Property Address: 59 DANIELS ST UNIT 3

Parcel Number: 0019-0156-0000 CAMA Number: 0019-0156-000J

Property Address: 59 DANIELS ST UNIT 4

Parcel Number: 0019-0156-0000 CAMA Number: 0019-0156-000K

Property Address: 59 DANIELS ST UNIT 5

Parcel Number: 0019-0156-0000

CAMA Number: 0019-0156-000L

Property Address: 59 DANIELS ST UNIT 6

Parcel Number: 0019-0219-0000

CAMA Number: 0019-0219-0000 Property Address: 28 TIMBERLINE RD

Parcel Number: 0019-0220-0000

CAMA Number: 0019-0220-0000 Property Address: 26 TIMBERLINE RD

Parcel Number: 0019-0227-0000 CAMA Number: 0019-0227-0000

Property Address: TIMBERLINE RD

Parcel Number: 0022-0029-0000 CAMA Number: 0022-0029-0000

Property Address: MAIN ST

Parcel Number: 0024-0017-0000

CAMA Number: 0024-0017-0000 Property Address: 53 DANIELS ST

Parcel Number: 0052-0001-0000

CAMA Number: 0052-0001-0000

Property Address: WATER ST

Parcel Number: 0052-0010-0000 CAMA Number: 0052-0010-0000

Property Address: WATER ST

9/15/2021

Mailing Address: THE UMA MALLIKHARJUNA

FOUNDATION, INC 1 NAVAHO DRIVE CANTON, MA 02021

Mailing Address: O'NEILL JOHN F

59 DANIELS ST UNIT 3 MILLIS, MA 02054

Mailing Address: MB RE RENTALS LLC

19 FIELD RD

MEDWAY, MA 02053

Mailing Address: BUSCH JESSICA

59 DANIELS ST UNIT 5 MILLIS, MA 02054

Mailing Address: QUINNAN SCOTT & QUINNAN MARY

**ANNE** 

59 DANIELS ST UNIT 6 MILLIS, MA 02054

Mailing Address: MARTHINSEN ERIC J & EFFIMA P

28 TIMBERLINE RD MILLIS, MA 02054

Mailing Address: KONEVICH MATTHEW J & SUSAN M

26 TIMBERLINE RD MILLIS, MA 02054

Mailing Address: MILLER CHARLES S & SIRIPHAN S

89 ISLAND RD MILLIS, MA 02054

Mailing Address: HARKEY PETER

256 ORCHARD ST MILLIS, MA 02054

Mailing Address: OREILLY MARK E & KAREN A

53 DANIELS ST MILLIS, MA 02054

Mailing Address: TOWN OF MILLIS

WATER ST

MILLIS, MA 02054

Mailing Address: TOWN OF MILLIS

900 MAIN ST

MILLIS, MA 02054





Parcel Number:

**CAMA Number:** 

#### 300 foot Abutters List Report

Millis, MA September 15, 2021

Parcel Number: 0052-0014-0000 CAMA Number:

0052-0014-0000

0052-0015-0000

0052-0015-0000

Property Address: WATER ST

Property Address: WATER ST

Mailing Address: TOWN OF MILLIS

WATER ST

MILLIS, MA 02054

Mailing Address: TOWN OF MILLIS

WATER ST

MILLIS, MA 02054



## ATTACHMENT C Wetland Data Forms

#### DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

The state of the s		
Location: Walley St Mills	Owner:	Prepared by: Basbanes Wetland Consulting
		parameter rectains consuming

Check all that apply:

	Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
7	Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
	Method other than dominance test used (attach additional information)

Section I. Vegetation	Data Plot:		Date of Delineation: April 14 2021	
A. Sample Layer and Plant Species (common/scientific name (or basal area)	B. Percent Cover Dominance	C. Percent (yes or no)	D. Dominant Plant Indicator Category*	E. Wetland
Red Maple (Acermbran)	60	67	Y	TEAC
Beech (fagus ganolifshin)	90	100	7	FACU
Highbush Bluebery (Vaccomen coryabism	30	37.5	M	A Torre
Spicebosh (lindera benzoin)	20	25	-1	* FACW
M. tchazel (Hemmanules Wigereard)	20	25	Y	x FACW
Whiltiflere Doce (Rosa multiplora)	10	12.5	N	X FAC
	80	100		FACU
Stank Cathoge (Symplocagus foet dus)	50	100	4	6 BAL
			A.	

Vegetation conclusion:

Number of dominant wetland indicator plants:

Number of dominant non-wetland indicator plants:

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants?

## **Hydric Soil Interpretation**

501

## 1. Soil Survey

Is there a published soil survey for this site?

Title/date:

Webson

Map number:

Fleetown

Soil type mapped: Hydric soil inclusions:

Are field observations consistent with soil survey?

Remarks:

## 2. Soil Description

<u>Horizon</u>	<u>Depth</u>	Matrix color	Mottle color
0	<1"		
A	0-12"	10412/1	Muck
3	12-18"	104R 5/3	>30% feather Seduced

#### 3. Other:

Conclusion: Is soil hydric?

## Other Indicators of Hydrology: (check all that apply and describe)

Indicator	Yes	No	Description
Site inundated			
Depth to free water		H	
Depth to soil saturation	1		8ti
Water marks			
Drift lines			
Sediment deposits			
Drainage patterns in BVW	1		
Oxidized rhizospheres			
Water stained leaves			
Recorded data			
Other			

## Vegetation and Hydrology Conclusion

	Yes No
Wetland plants > non wetland plants	V
Hydric soil present	V
Other indicators	1
Sample location is in the BVW	

## DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Location: Water Sr Millis	MA Owner:	Prepared by: Basbanes Wetland Consulting
Check all that apply:		

Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
Method other than dominance test used (attach additional information)

Section I. Vegetation	Data Plot: 2		Date of Delineation: April 14, 2021		
A. Sample Layer and Plant Species (common/scientific name (or basal area)	B. Percent Cover Dominance	C. Percent (yes or no)	D. Dominant Plant Indicator Category*	E. Wetland	
Beech (fagus grandifalis.) Red Dat (Avercus pubru) Red Maple (Ava mbrun)	30 20 90	44.4 33.3 22.2	4	FACU FACU * FAC	
With hard (Hamnarelis informance)	30	75	y	* FAC	
hults flora Dose (Rosa mulh Plana)	40	100	4	FACU	

Vegetation conclusion:

Number of dominant wetland indicator plants:



Number of dominant non-wetland indicator plants:

## **Hydric Soil Interpretation**

## 1. Soil Survey

Is there a published soil survey for this site?

Map number:
Soil type mapped: Marmarak

Hydric soil inclusions:

Are field observations consistent with soil survey?

Remarks: Area disturbed

#### 2. Soil Description

<u>Horizon</u>	<u>Depth</u>	Matrix color	Mottle color
0			
Af	0-14	104/2 3/2	f. 11 Marteral
3,	14-18	184R 43	No feature

#### 3. Other:

Conclusion: Is soil hydric?

## Other Indicators of Hydrology: (check all that apply and describe)

Indicator	Yes	No	Description
Site inundated			
Depth to free water			
Depth to soil saturation			
Water marks			
Drift lines			
Sediment deposits			
Drainage patterns in BVW			
Oxidized rhizospheres			
Water stained leaves			
Recorded data			
Other			

#### **Vegetation and Hydrology Conclusion**

	res No
Wetland plants > non wetland plants	V
Hydric soil present	1
Other indicators	
Sample location is in the BVW	



# ATTACHMENT D Project Plans

# TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WATER TREATMENT PLANT PFAS UPGRADES

# SEPTEMBER 2021

## **SELECT BOARD**

PETER JURMAIN CHAIR

ERIN UNDERHILL VICE CHAIR

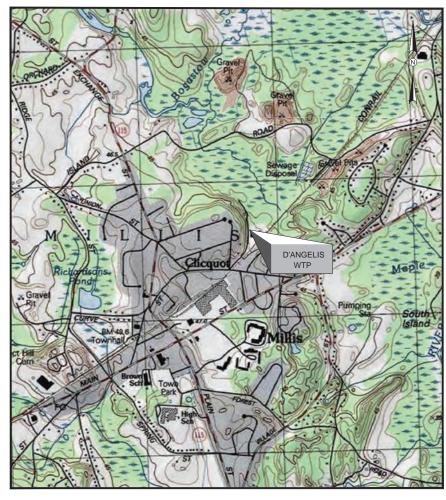
CRAIG SCHULTZE CLERK

## **DIRECTOR OF PUBLIC WORKS**

JAMES F. McKAY

#### WATER AND SEWER SUPERINTENDENT

**RON McKENNEY** 



LOCUS PLAN



#### SHEET NUMBER DRAWING TITLE

<u>OTTLET TYOMBER</u>	510,000,000
	COVER
G-001	GENERAL NOTES AND LEGEND
C-001	SITE PREPARATION AND DEMOLITION PLAN
C-002	PROPOSED SITE PLAN
C-101	CIVIL DETAILS 1
C-102	CIVIL DETAILS 2
M-001	PROCESS FLOW DIAGRAM
M-002	PROCESS EQUIPMENT SCHEDULES
M-003	PROCESS FLOOR PLAN
M-004	PROCESS SECTIONS
M-005	PUMP STATION MODIFICATIONS
D-001	EXISTING STORAGE BUILDING DEMOLITION
D-002	FORMER ANIMAL SHELTER BUILDING DEMOLITION
A-001	GENERAL NOTES, LEGEND AND ABBREVIATIONS
A-101	FLOOR PLAN AND ROOF PLAN
A-201	EXTERIOR BUILDING AND ELEVATIONS
A-301	BUILDING SECTIONS
A-401	WALL SECTIONS
A-501	EXTERIOR DETAILS
A-601	DOOR SCHEDULE AND DETAILS
S-001	GENERAL NOTES SHEET 1 OF 2
S-002	GENERAL NOTES SHEET 2 OF 2
S-011	TYPICAL DETAILS SHEET 1 OF 2
S-012	TYPICAL DETAIL SHEET 2 OF 2
S-101	FOUNDATION PLAN
S-102	CONCRETE SLAB PLAN
S-201	SECTION SHEET 1 OF 2
S-202	SECTION SHEET 2 OF 2
E-1	ELECTRICAL LEGEND AND GENERAL NOTES
E-2	ELECTRICAL GENERAL NOTES
E-3	ELECTRICAL ONE LINE DIAGRAM
E-4	ELECTRICAL SITE PLAN
E-5	ELECTRICAL FLOOR PLAN
E-6	ELECTRICAL LIGHTING FLOOR PLAN
E-7	ELECTRICAL LOW VOLTAGE FLOOR PLAN
E-8	ELECTRICAL WTP FLOOR PLAN
E-9	ELECTRICAL PUMP STATION FLOOR PLAN
E-10	ELECTRICAL BLOCK DIAGRAMS
E-11	ELECTRICAL CONTROL & RISER DIAGRAMS
E-12	ELECTRICAL CONTROL WIRING DIAGRAMS
H-1	HVAC LEGEND AND GENERAL NOTES
H-2	HVAC FLOOR PLAN
H-3	HVAC SCHEDULE
P-1	PLUMBING LEGEND, GENERAL NOTES AND SCHEDULES
P-2	PLUMBING FLOOR PLAN

PLUMBING LEGEND, GENERAL NOTES AND SCHEDULES

PLUMBING FLOOR PLAN
PLUMBING DETAILS

REVIEW SET
NOT FOR
CONSTRUCTION

TEMPORARY BENCH MARKS:

TBM BREN-1: SQUARE CUT IN CONCRETE TRANSFORMER PAD TBM BREN-2: ROUND HEAD NAIL IN CONCRETE WALKWAY TBM BREN-3: SQUARE CUT IN CONCRETE WALL CAP

- 4. THE PROPERTY LINES SHOWN HERE WERE COMPILED FROM MASSGIS ONLINE DATABASE, ARE APPROXIMATE ONLY, AND ARE SHOWN FOR GRAPHICAL
- 5. THE WETLANDS DEPICTED HEREON WERE DELINEATED BY LEAH BASBANES IN APRIL 2021
- THE CONTRACTOR SHALL CALL THE DIG-SAFE CENTER AT 1-888-344-7233 A MINIMI IM OF 72 HOLIRS PRIOR TO ANY EXCAVATION TO LOCATE UNDERGROUND UTILITIES IN THE FIELD AND NOTIFY UTILITIES OF CONSTRUCTION.
- INFORMATION SHOWN ON THE DRAWINGS RELATING TO MATERIALS, CONDITIONS AND/OR LOCATIONS OF EXISTING STRUCTURES AND UTILITIES HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING FIELD SURVEY, AERIAL PHOTOGRAPHY, RECORD MAPS AND DRAWINGS, AND UTILITY RECORD DRAWINGS AND IS NOT GUARANTEED CORRECT OR COMPLETE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY EXISTING CONDITIONS AND DIMENSIONS INCLUDING THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION. LOCATIONS AND DEPTHS OF CRITICAL UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR IN THE FIELD BY TEST PITS AS APPROVED BY THE ENGINEER. ANY DAMAGE TO UTILITIES CAUSED BY THE CONTRACTOR SHALL BE THE CONTRACTOR'S RESPONSIBILITY, AND COSTS FOR THE REPAIR OR REPLACEMENT OF SUCH DAMAGED UTILITIES SHALL BE BORNE BY THE CONTRACTOR
- ACCORDING TO FIRM (FLOOD INSURANCE RATE MAP) COMMUNITY PANEL 250244; REVISION DATED 7/17/2012, THE APPROXIMATE FLOODPLAIN ELEVATION ON THE SITE IS 122 FEET.

#### SOIL EROSION AND SEDIMENT CONTROL NOTES

- APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO SOIL DISTURBANCE. MEASURES SHALL BE TAKEN TO CONTROL EROSION WITHIN THE PROJECT AREA. SEDIMENT IN RUNOFF WATER SHALL BE TRAPPED AND RETAINED WITHIN THE PROJECT AREA. WETLAND AREAS AND SURFACE WATERS SHALL BE PROTECTED FROM
- CONTRACTOR SHALL MINIMIZE TOTAL AREA OF DISTURBANCE AND PROTECT NATURAL FEATURES AND SOIL.
- INSTALL AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES IN

  EPA'S CONSTRUCTION GENERAL PERMIT REQUIREMENTS, THE MORE STRINGENT REQUIREMENT SHALL APPLY.
- CONTRACTOR TO COMPLY WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS INCLUDING WASTE DISPOSAL.
- 5. CONTRACTOR SHALL PROPERLY MANAGE ON-SITE CONSTRUCTION AND WASTE
- 6. CONTRACTOR SHALL IMPLEMENT APPROPRIATE DUST CONTROL MEASURES AT THE SITE.

- STOCKPILE SIDE SLOPES SHALL NOT BE GREATER THAN 1:1. ALL STOCKPILES SHALL BE SURROUNDED BY SEDIMENT CONTROLS.
- 9. A VEHICLE TRACKING PAD OR OTHER APPROVED STABILIZATION METHOD SHALL BE CONSTRUCTED AT ALL ENTRANCE/EXIST POINTS OF THE SITE TO PREVENT SOIL CARRIED ONTO ROADWAYS AND OFF THE SITE. CONTRACTOR SHALL FURNISH A MECHANICAL SWEEPER ON SITE FOR THE PURPOSE OF SWEEPING ALL PAVED AREAS ON A DAILY BASIS OR AS REQUIRED TO PREVENT SOIL TRACKING ON ROADWAYS.
- 10. ALL PREVIOUSLY DISTURBED LAND SHALL BE STABILIZED BY APPROVED METHODS AFTER 14 DAYS IF LEFT UNDISTURBED. THIS INCLUDES STOCKPILES, CONSTRUCTION ENTRANCES GRADED AREAS AND OTHER CONSTRUCTION ACTIVITY RELATED CLEARING
- 11. PERMANENT SEEDING SHALL BE UNDERTAKEN IN THE SPRING FROM MARCH THROUGH MAY, AND IN LATE SUMMER AND EARLY FALL FROM AUGUST TO OCTOBER 15. DURING THE PEAK SUMMER MONTHS AND IN THE FALL AFTER OCTOBER 15, WHEN SEEDING IS FOUND TO BE IMPRACTICAL, APPROPRIATE TEMPORARY STABILIZATION SHALL BE APPLIED. PERMANENT SEEDING MAY BE UNDERTAKEN DURING THE SUMMER IF PLANS PROVIDE FOR ADEQUATE MULCHING AND WATERING.
- 12. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED AFTER FINAL SITE STABILIZATION. DISTURBED SOIL AREAS RESULTING FROM THE REMOVAL OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED WITHIN 30
- 13. IF WORK IS HALTED OVER WINTER MONTHS THE CONTRACTOR SHALL BE RESPONSIBLE
- CONTRACTOR TO INSTALL EROSION AND SEDIMENTATION CONTROLS IN ACCORDANCE WITH SPECIFICATION SECTION 01568 AND DETAILS PROVIDED ON SHEET C-101 THROUGH

#### WORK OF GENERAL CONTRACTOR:

- THE GENERAL CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS REQUIRED TO COMPLETE THE D'ANGELIS WTP PFAS UPGRADES. COMPLETE AND READY FOR OPERATION AS INDICATED ON THE DRAWINGS AND SPECIFICATIONS, INCLUDING ALL CONTRACT DOCUMENTS.
- THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF SUBCONTRACTORS' WORK WITH EACH OTHER AND WITH THE WORK OF THE GENERAL CONTRACTOR
- THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE OVERALL CONSTRUCTION SEQUENCE AND NOTE THAT IT IS OF EXTREME IMPORTANCE ON THIS PROJECT. THE D'ANGELIS WTP IS CURRENTLY OFFLINE AT THIS TIME AND WILL BE DURING THE DURATION OF CONSTRUCTION.
- 4. THE GENERAL CONTRACTOR SHALL NOT STORE EQUIPMENT OR STOCKPILE MATERIAL WITHIN 100' OR 50' WETLAND BUFFER ZONES.
- 5. THE GENERAL CONTRACTOR SHALL PROVIDE ADEQUATE EROSION CONTROL DURING CONSTRUCTION, SEE SPECIFICATION SECTION 01568 AND NOTES ON
- 6. SOME PIPE/EQUIPMENT CONNECTIONS MAY REQUIRE TRANSITION FITTING OR OTHER FITTINGS NOT SHOWN ON DRAWINGS. THE CONTRACTOR SHALL PROVIDE ADEQUATE FITTING TO MAKE COMPLETE CONNECTION.
- WHERE BURIED DUCTILE IRON PIPE LEAVES/ENTERS A BUILDING OR STRUCTURE, THE GENERAL CONTRACTOR SHALL PROVIDE MULTIPLE MECHANICAL JOINT
- 8. PROPOSED FIELD MODIFICATION, REVISIONS AND ADDITIONS TO THE DESIGN. DRAWINGS MUST BE APPROVED BY THE ENGINEER, IN WRITING, BEFORE WORK BEGINS. ANY REQUEST TO DEVIATE FROM THE ENGINEER'S SPECIFIED DETAILS ON THE DESIGN DRAWINGS BY THE CONTRACTOR MUST BE SUBMITTED IN WRITING TO THE ENGINEER FOR APPROVAL
- 9. GENERAL CONTRACTOR AND SUBCONTRACTORS MUST PROVIDE ALL MATERIAL. LABOR FOLIPMENT CONSUMABLES AND ALL OTHER ITEMS REQUIRED TO COMPLETE THE WORK AS SPECIFIED ON THE DESIGN DRAWINGS, PROJECT SPECIFICATIONS, AND AS NECESSARY TO COMPLETE THE WORK.
- 10. GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL VISIT THE PROJECT SITE AND OBSERVE CONDITIONS FOR THE PROPOSED CONSTRUCTION. ANY DISCREPANCY BETWEEN THE DESIGN DRAWINGS AND ACTUAL SITE CONDITIONS MUST BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ENGINEER. IN WRITING, FOR RESOLUTION PRIOR TO COMMENCEMENT OF THE WORK.
- 11. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS. ELEVATIONS AND DIMENSIONS PRIOR TO FABRICATING NEW WORK THAT WILL BE CONNECTED TO EXISTING CONSTRUCTION.
- 12. ALL ITEMS OF CONSTRUCTION MUST BE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS APPLICABLE TO THE PROJECT.
- 13. THE CONTRACTOR IS RESPONSIBLE FOR SEGREGATING WORK AREAS FROM THE GENERAL PUBLIC USING TEMPORARY FENCES, SIGNS, CONES, CAUTION TAPE,
- 14. THE CONTRACTOR'S BASE BID FOR THIS PROJECT MUST INCLUDE ALL LABOR,

  \*\*\*\*MOBILIZATION; PERMITTING, MATERIALS, TEMPORARY PROTEOTION, ETG. \*\*NO\*\*\*

  ADDITIONAL COSTS WILL BE SUBMITTED TO THE ENGINEER IN ORDER TO COMPLETE THE INTENT OF THE WORK AS INDICATED ON THE DESIGN DRAWINGS.
- 15. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING WATER AND ELECTRICITY REQUIRED TO PERFORM THE WORK. SUBMIT PROPOSED MEANS AND METHODS
- 16. ALL DIMENSIONS AND QUANTITIES MUST BE DETERMINED OR VERIFIED BY THE CONTRACTOR. QUANTITIES TO BE CARRIED UNDER THE BASE BID WORK HAVE BEEN INDICATED ON THE CONTRACT DRAWINGS. THE CONTRACT DRAWINGS

  "HAVE BEEN COMPILED FROM VARIOUS SOURCES AND MAY NOT REFLECT THE" ACTUAL CONDITION AT THE MOMENT OF CONSTRUCTION. THE CONTRACTOR IS CAUTIONED TO TAKE ALL PRECAUTIONS AND MAKE ALL INVESTIGATIONS NECESSARY TO INSTALL THE PROPOSED WORK.
- 17. ITS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND THE SUBCONTRACTOR TO REVIEW ALL DRAWINGS, PROJECT MANUAL, AGENDA ETC. IN ORDER TO ASSURE THE COORDINATION OF ALL WORK AFFECTING EACH TRADE, FAILURE TO REVIEW AND COORDINATE ALL CONTRACTOR DOCUMENTS BY THE GENERAL WITH ALL THE SUBCONTRACTORS FOR APPLICABLE ITEMS OF THE WORK SHALL NOT RELIEVE THE RESPONSIBILITY PARTY FROM PERFORMING ALL WORK SO REQUIRED AS PART OF THE CONTRACT.
- 18. ITS IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND THE SUBCONTRACTOR FOLLOWING THE REVIEW OF ALL THE DRAWINGS. PROJECT MANUAL, ADDENDA, ETC. TO INFORM THE ENGINEER OF ANY DISCREPANCIES IN THE DOCUMENTS AND TO OBTAIN CLARIFICATION ON ALL ITEMS AFFECTING CONSTRUCTION COST PRIOR TO THE SUBMISSION OF THE BID.





One Beacon Street, Suite 8100 Boston, MA 02108 Phone: 617-497-7800

Signed By: ####

	REVISIONS			
REV	DESCRIPTION	DSN	CHK	DATE
KEV	7 BESCRIFTION	DWN	APP	DATE
				-

SCALE VERIFICATION

HIS BAR IS 1 INCH IN LENGT ON ORIGINAL DRAWING

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

DRAWING NTS

ORIGINAL DRAWING SIZE IS 22 x 34 GENERAL LEGEND AND NOTES

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PEAS LIPGRADES



TOWN OF MILLIS EPARTMENT OF PUBLIC WORKS ENGINEERIN 900 MAIN ST, MILLIS, MA 02054 SINEERING DIVISI

60% DESIGN

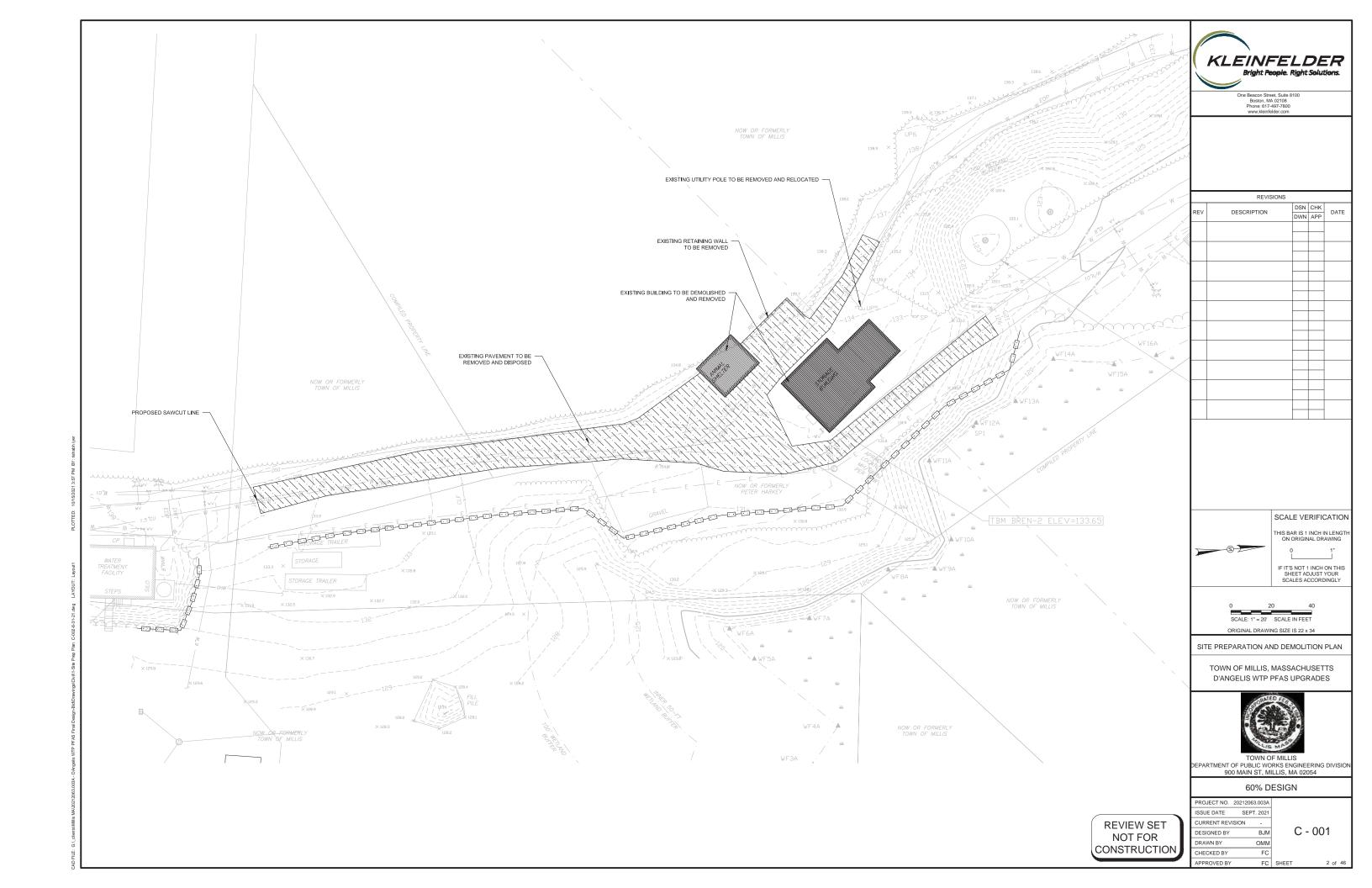
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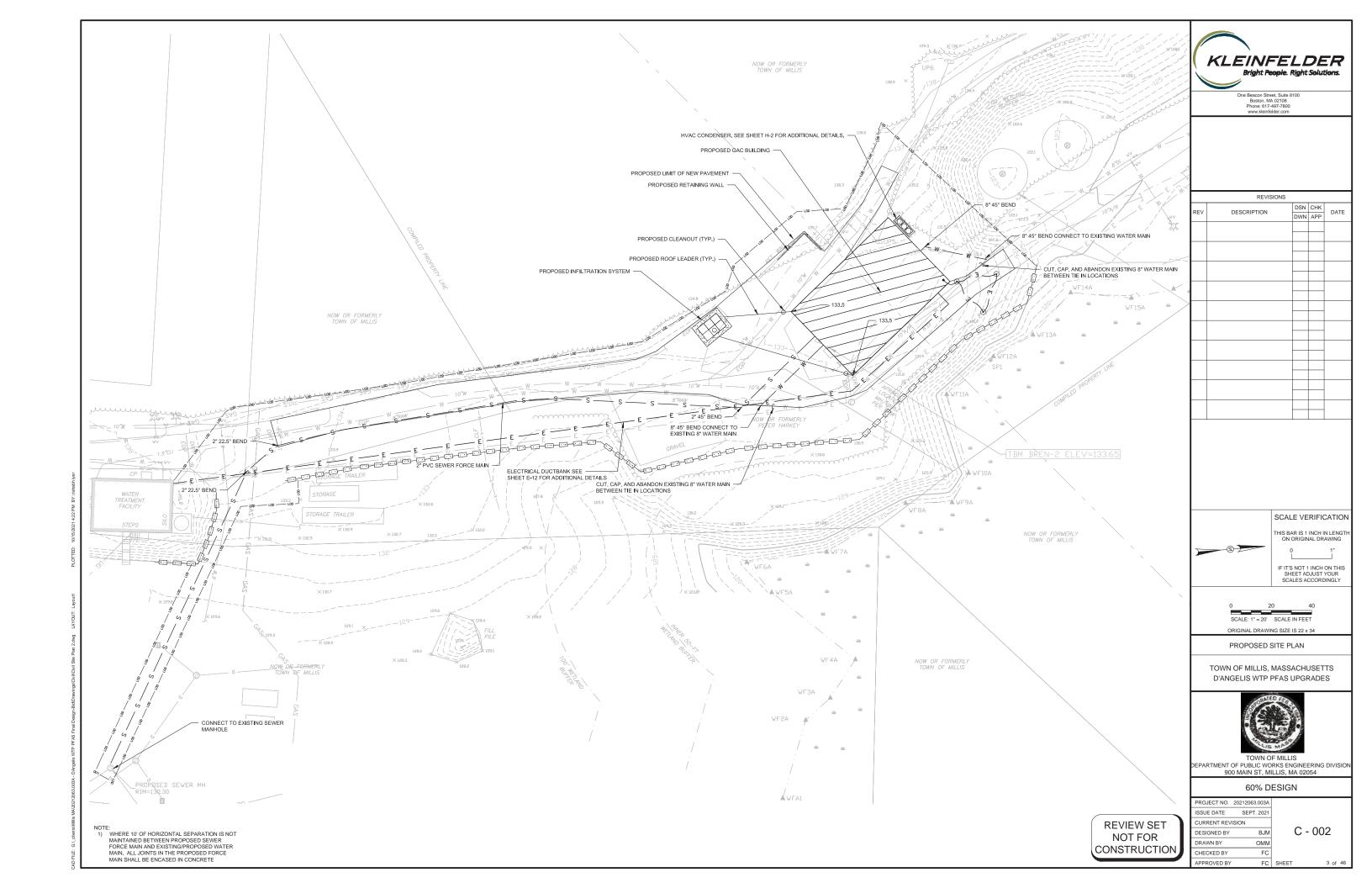
PROJECT NO. 20212063.003/ SSUE DATE SEPT. 202 CURRENT REVISION ESIGNED BY RAWN BY HECKED BY

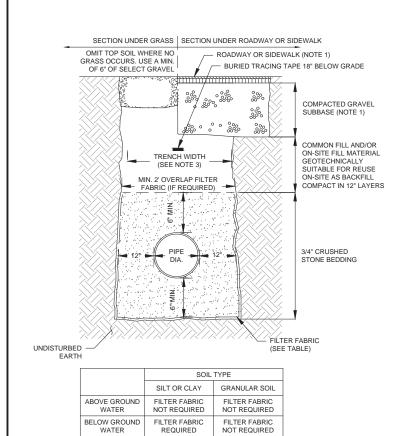
**REVIEW SET** 

G-001

NOT FOR CONSTRUCTION







TYPICAL TRENCH DETAIL

UNDISTURBED EXISTING PAVEMENT

12" COMPACTED

(TYP.)

GRAVEL SUBBASE

REMOVE EXISTING PAVEMENT

COURSE (CLASS 2) OVER 1 1/2" BINDER

SAW CUT EDGE FULL DEPTH, TACK COAT EDGE OF EXISTING PAVEMENT WITH ASPHALT EMULSION SS-1.

4" COMPACTED

GRAVEL SUBBASE

- UNDISTURBED EARTH

AND PLACE 1 1/2" OF BITUMINOUS CONCRETE TOP

COURSE (CLASS 1)

1:-6"

(TYP.)

\_COMPACTED\_

BACKFILL

TRENCH WIDTH

PERMANENT PAVEMENT REPAIR DETAIL

30" STANDARD MANHOLE FRAME & COVER (UNLESS NOTED OTHERWISE ON PLAN) TO BE MARKED "DRAIN" SET RIM AT FINISH GRADE 30" STANDARD MANHOLE FRAME COVER (UNLESS NOTED OTHERWISE) TO BE PLAN MARKED "DRAIN" USE BRICK COURSES AS NEEDED TO BRING MANHOLE RIM TO REQUIRED ELEVATION (MAX 3 COURSES OF BRICKS) SEAL INSIDE AND OUTSIDE OF BRICK WITH HYDRAULIC CEMENT SET CASTING IN GROUT AND GROUT ALL -AROUND TO 4" ABOVE THE FLANGE (UNLESS NOTED OTHERWISE) **SECTION** 

- NOTES:

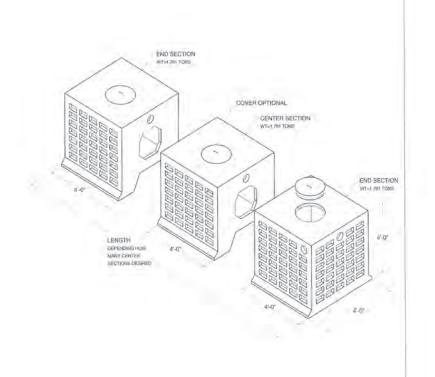
  1. MANHOLE COVERS AND FRAMES SHALL BE 8-INCHES HIGH AND SHALL BE MANUFACTURED BY EAST JORDON IRON WORKS (MODEL LK110A) OR APPROVED EQUAL.

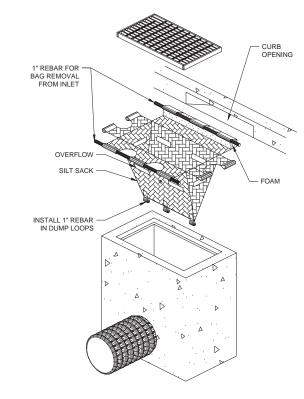
  2. CASTING FRAMES SHALL BE SET IN FULL MORTAR BED WITH BRICKS, A MAXIMUM OF 8 INCHES THICK. ALL CASTINGS SHALL BE IN A FULL CONCRETE COLLAR. COLLAR TO BE 4,000 PSI CONCRETE.

  3. ALL FRAMES AND GRATES OR COVERS SHALL BE AMERICAN-MADE.

  4. STRUCTURE SHALL BE CERTIFIED BY MANUFACTURER TO MEET AASHTO H20 LOADING.

## INFILTRATION ACCESS MANHOLE DETAIL





- NOTES:

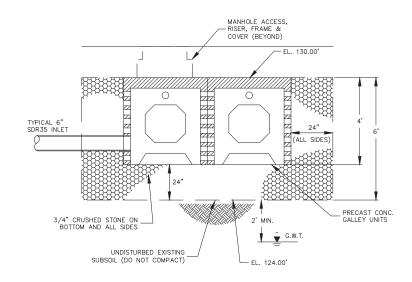
  1. CONTRACTOR SHALL REMOVE SEDIMENT AS NECESSARY TO
- MAINTAIN LEVEL BELOW OVERFLOW HOLES IN SILT SACK.
  2. SILT SACK SHALL BE USED ON ALL EXISTING CATCH BASINS AS INDICATED.
- INDICATED.

  CONTRACTOR IS RESPONSIBLE FOR MAINTAINING
  SEDIMENTATION BARRIERS THROUGHOUT THE DURATION OF
  THE PROJECT.

  CONTRACTOR SHALL REMOVE AND LEGALLY DISPOSE OF

- 4. CONTRACTOR STALL REMOVE AND LEGALLY DISPOSE OF SEDIMENT AS REQUIRED.
  5. CONTRACTOR SHALL REMOVE SILT SACKS AND LEGALLY DISPOSE OF THEM OFF-SITE, UPON COMPLETION OF THE PROJECT AND AS REQUIRED

## SILT SACK DETAILS



SECTION A-A SCALE: 1" = 2'

INFILTRATION GALLEY SYSTEM SECTION (TYP.)

**REVIEW SET** NOT FOR CONSTRUCTION



One Beacon Street, Suite 8100 Boston, MA 02108 Phone: 617-497-7800 www.kleinfelder.com

	REVISIONS			
	DESCRIPTION	DSN	СНК	DATE
REV		DWN	APP	DATE

SCALE VERIFICATION

HIS BAR IS 1 INCH IN LENGT

ON ORIGINAL DRAWING

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

CIVIL DETAILS 1

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES

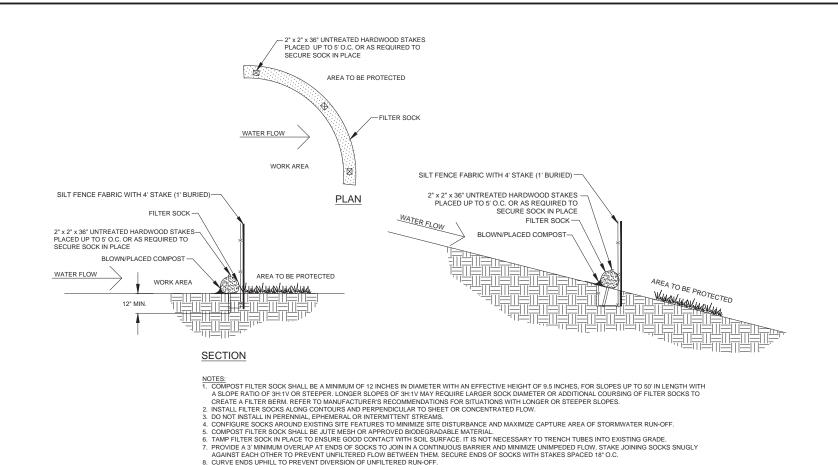


TOWN OF MILLIS DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISIO 900 MAIN ST, MILLIS, MA 02054

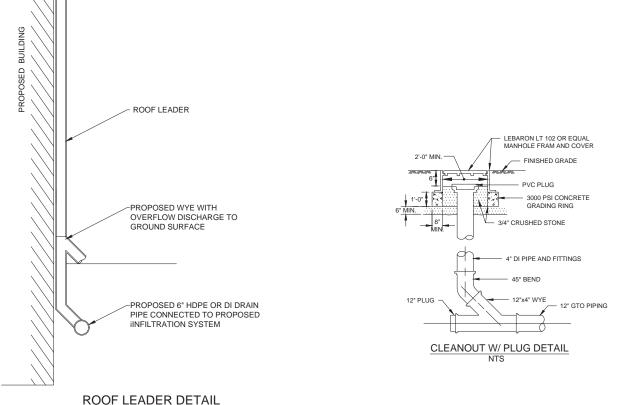
#### 60% DESIGN

	PROJECT NO. 20	0212063.003A	
	ISSUE DATE	SEPT. 2021	
F	CURRENT REVISI	ION	
П	DESIGNED BY	BJM	
	DRAWN BY	OMM	
Ė	CHECKED BY	FC	
	APPROVED BY	FC	SHEET

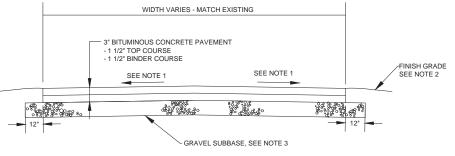
C-101



COMPOST FILTER SOCK WITH SILT FENCE NTS



8. CURVE ENDS UPHILL TO PREVENT DIVERSION OF UNFILTERED RUN-OFF.



## ROADWAY RECONSTRUCTION

NOTES

1. SEE GRADING PLANS TO DETERMINE MAGNITUDE AND DIRECTION OF ROADWAY SLOPE.

- 2. COORDINATE WITH ONSITE ENGINEER TO DETERMINE FINISH GRADE MATERIAL DEPENDENT ON LOCATION.
- 3 PROOF ROLL EXISTING GRAVEL PRIOR TO PLACING BITHMINOUS CONCRETE PAVEMENT. AREAS THAT APPEAR TO HAVE MINIMAL GRAVEL OR HAVE SPONGY SOIL, REMOVE EXISTING SOIL A MINIMUM DEPTH OF 12\*, PLACE 12\* OF GRAVEL AND COMPACT

**REVIEW SET** NOT FOR CONSTRUCTION



One Beacon Street, Suite 8100 Boston, MA 02108 Phone: 617-497-7800 www.kleinfelder.com

	REVISIONS			
REV	DESCRIPTION	DSN	СНК	DATE
KEV	DESCRIPTION	DWN	APP	DATE
		•		

SCALE VERIFICATION

HIS BAR IS 1 INCH IN LENGT ON ORIGINAL DRAWING

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

CIVIL DETAILS 2

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



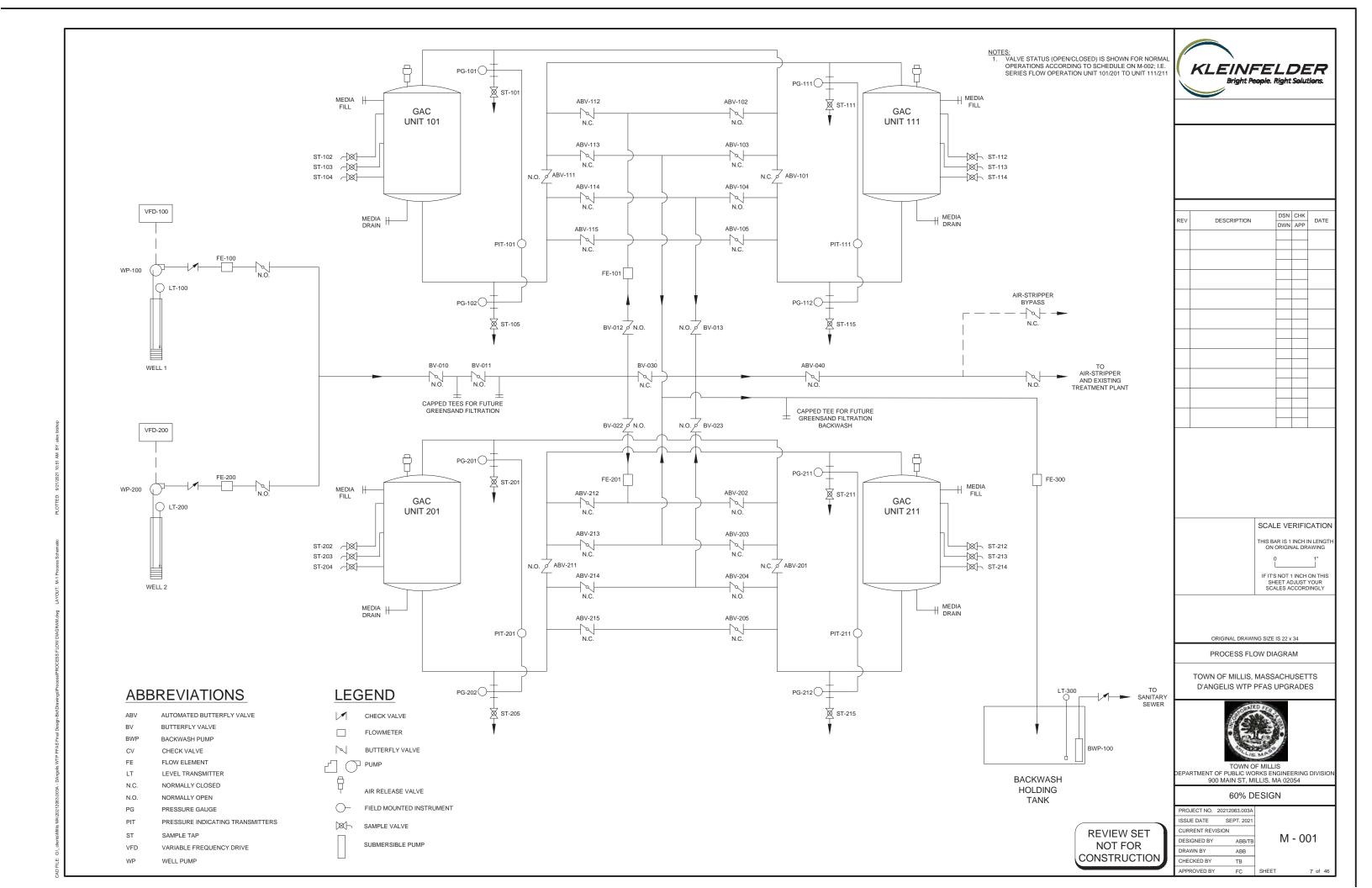
TOWN OF MILLIS DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISIO 900 MAIN ST, MILLIS, MA 02054

#### 60% DESIGN

PROJECT NO.	20212063.003A
ISSUE DATE	SEPT. 2021
CURRENT REV	ISION
DESIGNED BY	BJM
DRAWN BY	OMM
CHECKED BY	FC
APPROVED BY	FC

C-102

FC SHEET



TAG	SIZE	SERVICE	TYPE	OPERATOR	AUTO/MANUA
BV-010	8"	ISOLATION VALVE FOR FUTURE GREENSAND FILTRATION	BUTTERFLY VALVE	OPEN/CLOSE	MANUAL
BV-011	8"	ISOLATION VALVE FOR FUTURE GREENSAND FILTRATION	BUTTERFLY VALVE	OPEN/CLOSE	MANUAL
BV-012	8"	GAC 101/111 INFLUENT	BUTTERFLY VALVE	OPEN/CLOSE	MANUAL
BV-013	8"	GAC 101/111 EFFLUENT	BUTTERFLYVALVE	OPEN/CLOSE	MANUAL
BV-022	8"	GAC 201/211 INFLUENT	BUTTERFLYVALVE	OPEN/CLOSE	MANUAL
BV-023	8"	GAC 201/211 EFFLUENT	BUTTERFLY VALVE	OPEN/CLOSE	MANUAL
BV-030	8 <sup>th</sup>	GAC BYPASS	BUTTERFLY VALVE	OPEN/CLOSE	MANUAL
ABV-040	8"	GAC MASTER BACKWASH	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-101	8"	GAC 101 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-102	8"	GAC 101 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-103	8.	GAC 101 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-104	8"	GAC 101 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-105	8"	GAC 101 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-111	8"	GAC 111 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV 112	8"	GAC 111 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-113	8"	GAC 111 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-114	8"	GAC 111 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-115	8"	GAC 111 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-120	8"	GAC 101/111 BACKWASH CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-201	gr.	GAC 201 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-202	8"	GAC 201 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-203	8"	GAC 201 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-204	8"	GAC 201 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-205	8"	GAC 201 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-211	8"	GAC 211 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-212	-8 <sup>n</sup>	GAC 211 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-213	8"	GAC 211 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-214	8"	GAC 211 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	
ABV-215	8"	GAC 211 CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ABV-220	gri.	GAC 201/211 BACKWASH CONTROL VALVE	BUTTERFLY VALVE	OPEN/CLOSE	AUTOMATIC
ST-101	10	SAMPLE TAP GAC 101 INFLUENT	SMOOTH BORE SAMPLE TAP		MANUAL
ST-102	1"	SAMPLE TAP GAC 101 INTERMEDIATE COLUMN TOP	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
ST-103	10	SAMPLE TAP GAC 101 INTERMEDIATE COLUMN TOP	SMOOTH BORE SAMPLE TAP		MANUAL
ST-104	1"	SAMPLE TAP GAC 101 INTERMEDIATE COLUMN TOP	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
5T-105	1"	SAMPLE TAP GAC 101 INFLUENT	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
ST-111	1"	SAMPLE TAP GAC 111 INFLUENT	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
ST-112	1"	SAMPLE TAP GAC 111 INTERMEDIATE COLUMN TOP	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
ST-113	1"	SAMPLE TAP GAC 111 INTERMEDIATE COLUMN TOP	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
ST-114	1"	SAMPLE TAP GAC 111 INTERMEDIATE COLUMN TOP	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
ST-115	1"	SAMPLE TAP GAC 111 INFLUENT	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
ST-201	10	SAMPLE TAP GAC 201 INFLUENT	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
ST-202	1"	SAMPLE TAP GAC 201 INTERMEDIATE COLUMN TOP	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
ST-202	1"		SMOOTH BORE SAMPLE TAP		MANUAL
	1"	SAMPLE TAP GAC 201 INTERMEDIATE COLUMN TOP		OPEN/CLOSE OPEN/CLOSE	
ST-204 ST-205	1"	SAMPLE TAP GAC 201 INTERMEDIATE COLUMN TOP SAMPLE TAP GAC 201 INFLUENT	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
	-			-	
5T-211	1"	SAMPLE TAP GAC 211 INFLUENT	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
ST-212	-	SAMPLE TAP GAC 211 INTERMEDIATE COLUMN TOP	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
ST-213	1"	SAMPLE TAP GAC 211 INTERMEDIATE COLUMN TOP	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL
ST-214	1"	SAMPLE TAP GAC 211 INTERMEDIATE COLUMN TOP	SMOOTH BORE SAMPLE TAP	OPEN/CLOSE	MANUAL

#### PUMP SCHEDULE

TAG	PUMP NAME	LOCATION	QUANTITY	TYPE
WP-100	WELL 1 MOTOR/PUMP	WELL 1	1	VERTICAL TURBINE
WP-200	WELL 2 MOTOR/PUMP	WELL 2	1	VERTICAL TURBINE
BWP-300	BACKWASH TANK	BACKWASH TANK	1	SUBMERSIBLE

#### INSTRUMENTATION SCHEDULE

TAG	SIZE	SERVICE
FE-100	8"	WELL 1 FLOW METER
FE-200	8"	WELL 2 FLOW METER
FE-101	8"	GAC 101/111 INFLUENT FLOWMETER
FE-201	8"	GAC 201/211 INFLUENT FLOWMETER
FE-300	8"	BACKWASH EFFLUENT FLOWMETER
PG-101	1"	GAC 101 INFLUENT PRESSURE GAUGE
PG-102	1"	GAC 101 EFFLUENT PRESSURE GAUGE
PIT-101	1"	GAC 101 DIFFERENTIAL PRESSURE TRANSDUCER
PG-111	1"	GAC 111 INFLUENT PRESSURE GAUGE
PG-112	1"	GAC 111 EFFLUENT PRESSURE GAUGE
PIT-111	1"	GAC 111 DIFFERENTIAL PRESSURE TRANSDUCER
PG-201	1"	GAC 201 INFLUENT PRESSURE GAUGE
PG-202	1"	GAC 201 EFFLUENT PRESSURE GAUGE
PIT-201	10	GAC 201 DIFFERENTIAL PRESSURE TRANSDUCER
PG-211	10	GAC 211 INFLUENT PRESSURE GAUGE
PG-212	1"	GAC 211 EFFLUENT PRESSURE GAUGE
PIT-211	1"	GAC 211 DIFFERENTIAL PRESSURE TRANSDUCER

#### GAC AND VALVE OPERATION SCHEDULE

MODE OF OPERATION	ABV-101	ABV-102	ABV-103	ABV-104	ABV-105	ABV-111	ABV-112	ABV-113	ABV-114	ABV-115	ABV-201	ABV-202	ABV-203	ABV-204	ABV-205	ABV-211	ABV-212	ABV-213	ABV-214	ABV-215	ABV-040
SERIES FLOW OPERATION UNIT 101/201 TO UNIT 111/211	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	OPEN
SERIES FLOW OPERATION UNIT 111/211 TO UNIT 101/201	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN
UNIT 101 ONLY BACKWASH (FILTERED THROUGH UNIT 201/211)	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UNIT 111 ONLY BACKWASH (FILTERED THROUGH UNIT 201/211)	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN.	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UNIT 101 FILTER TO WASTE (FILTERED THROUGH UNIT 201/211)	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UNIT 111 FILTER TO WASTE (FILTERED THROUGH UNIT 201/211)	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSEO	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UNIT 101 ONLY BACKWASH (FILTERED THROUGH UNIT 211/201)	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED
UNIT 111 ONLY BACKWASH (FILTERED THROUGH UNIT 211/201)	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED
UNIT 101 FILTER TO WASTE (FILTERED THROUGH UNIT 211/201)	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED
UNIT 111 FILTER TO WASTE (FILTERED THROUGH UNIT 211/201)	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED
UNIT 201 ONLY BACKWASH (FILTERED THROUGH UNIT 101/201)	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
UNIT 211 ONLY BACKWASH (FILTERED THROUGH UNIT 101/201)	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED						
UNIT 201 FILTER TO WASTE (FILTERED THROUGH UNIT 101/201)	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED
UNIT 211 FILTER TO WASTE (FILTERED THROUGH UNIT 101/201)	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED
UNIT 201 ONLY BACKWASH (FILTERED THROUGH UNIT 111/211)	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UNIT 211 ONLY BACKWASH [FILTERED THROUGH UNIT 111/211]	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN.	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UNIT 201 FILTER TO WASTE (FILTERED THROUGH UNIT 111/211)	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UNIT 211 FILTER TO WASTE (FILTERED THROUGH UNIT 111/211)	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED

NOTE: BVs 010, 011, 012, 013, 022, 023 SHALL REMAIN OPEN AND BV-30 SHALL REMAIN CLOSED UNDER NORMAL OPERATIONS,



REV	DESCRIPTION		CHK	DATE
IXE V	DEGOIGH FION	DWN	APP	DATE
		_		
		_		
		-		

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

PROCESS EQUIPMENT SCHEDULE

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



TOWN OF MILLIS DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 900 MAIN ST, MILLIS, MA 02054

60% DESIGN

**REVIEW SET** DRAWN BY CONSTRUCTION CHECKED BY

APPROVED BY

NOT FOR

PROJECT NO. 20212063.003 ISSUE DATE SEPT. 2021 CURRENT REVISION ABB/TB ABB

M - 002

FC SHEET

66'-10"



Signed By: REVISIONS DSN CHK
DWN APP DESCRIPTION



SCALE VERIFICATION

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

PRELIMINARY FLOOR PLAN

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 900 MAIN ST, MILLIS, MA 02054

60% DESIGN

PROJECT NO. 20212063.003A ISSUE DATE SEPT. 2021 CURRENT REVISION DESIGNED BY DRAWN BY

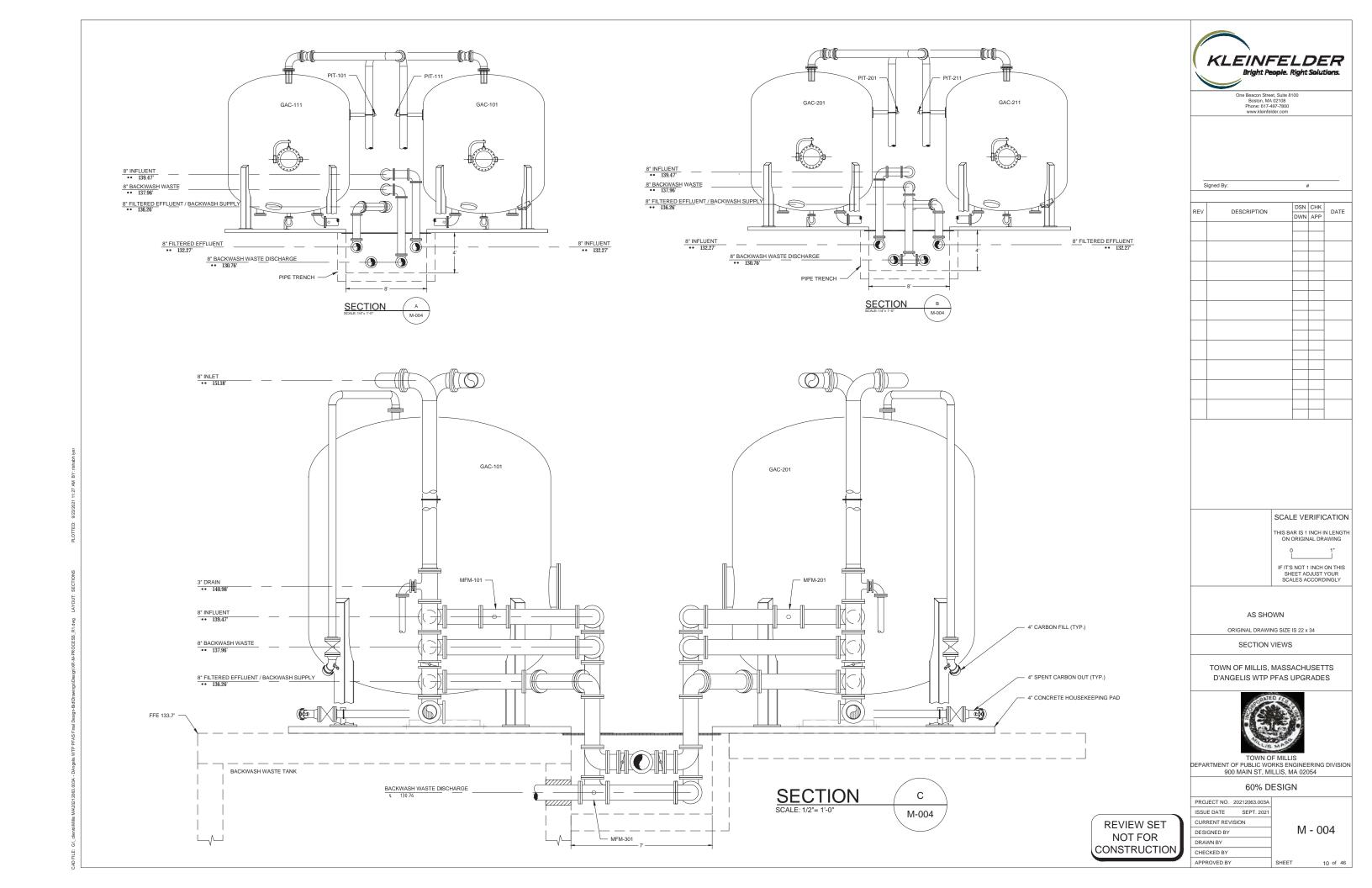
APPROVED BY

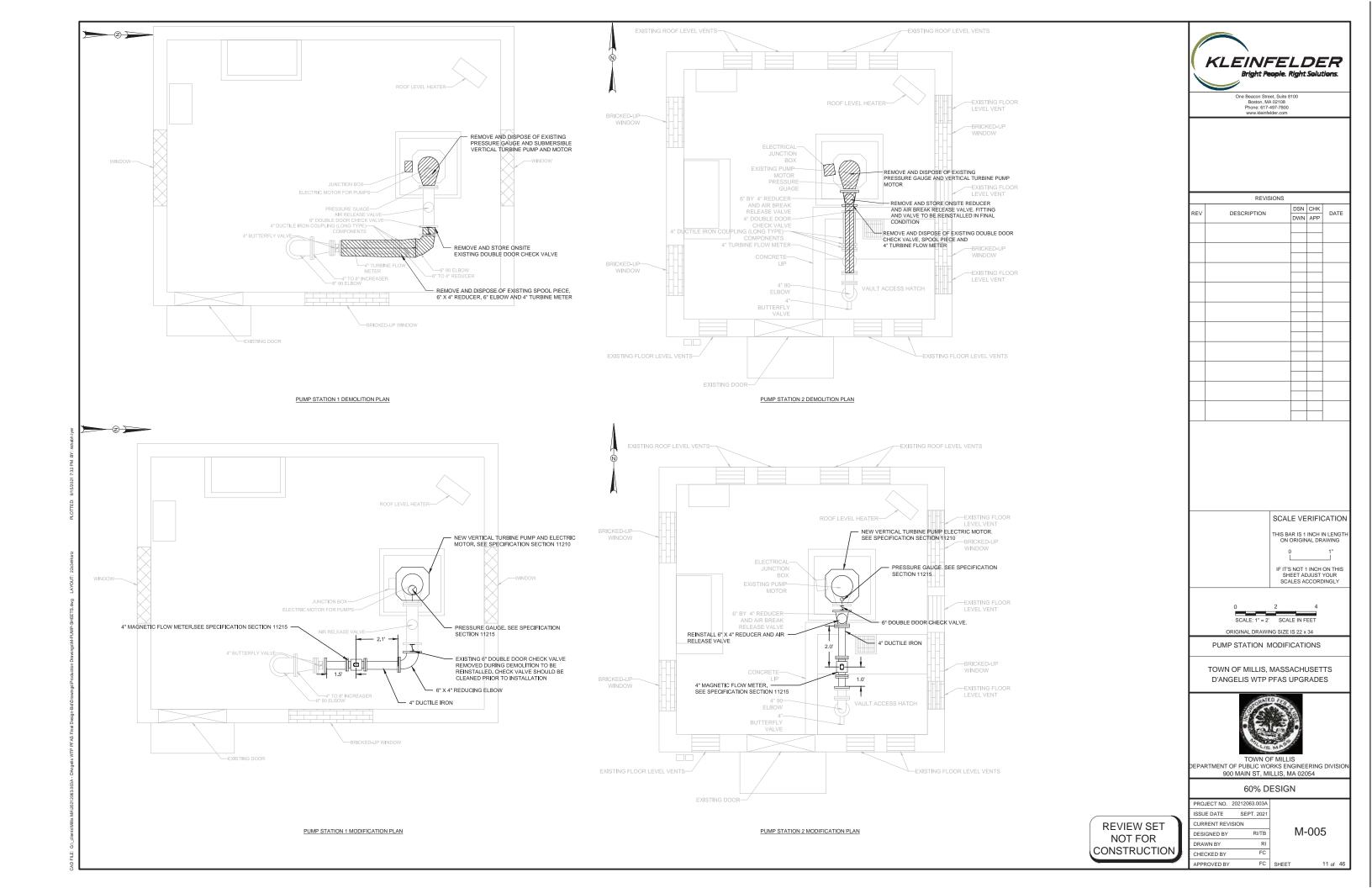
**REVIEW SET** 

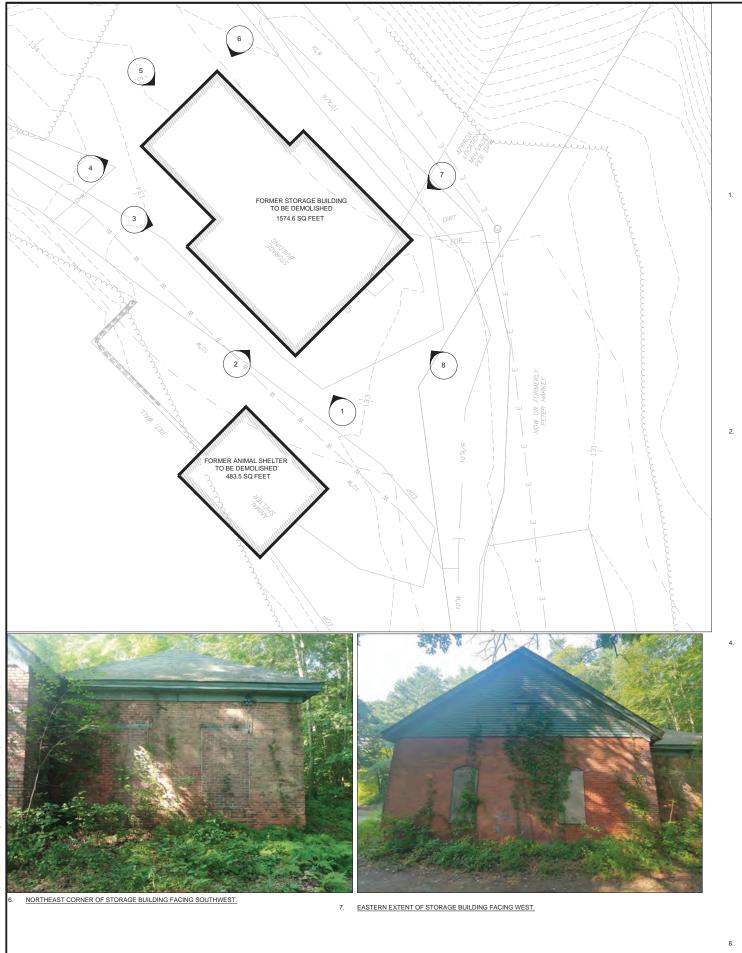
NOT FOR

CONSTRUCTION

M - 003 CHECKED BY SHEET









SOUTHWEST CORNER OF STORAGE BUILDING FACING NORTH



2. WEST SIDE OF STORAGE BUILDING FACING NORTHEAST



NORTHWEST CORNER OF STORAGE BUILDING FACING EAST.



NOTES

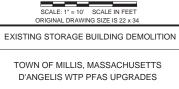
1) CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL DEMOLISHED BUILDINGS MATERIALS. FOR DETAILS REGARDING DEMOLITION OF EXISTING BUILDINGS SEE SPECIFICATION SECTION 02050.

2) A HAZARDOUS BUILDING MATERIALS SURVEY WAS COMPLETED BY CDW CONSULTANTS ON AUGUST 10, 2021 AND IS PROVIDED IN APPENDIX D OF THE SPECIFICATIONS.

3) ELECTRIC, WATER, AND NATURAL GAS SERVICES TO THE EXISTING BUILDINGS HAVE BEEN DECOMMISSIONED AND INTERIOR UTILITIES HAVE BEEN ABANDONED IN PLACE.



8. SOUTHEASTERN EXTENT OF THE STORAGE BUILDING FACING NORTHWEST



TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES

KLEINFELDER

One Beacon Street, Suite 8100 Boston, MA 02108 Phone: 617-497-7800 www.kleinfelder.com

REVISIONS

DESCRIPTION

DSN CHK DATE



TOWN OF MILLIS DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 900 MAIN ST, MILLIS, MA 02054

#### 60% DESIGN

	0070 B
PROJECT NO.	20212063.003A
ISSUE DATE	SEPT. 2021
CURRENT REV	ISION -
DESIGNED BY	RI/TB
DRAWN BY	RI
CHECKED BY	TB
APPROVED BY	FC

D-2

SCALE VERIFICATION THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

SHEET

12 of 46

**REVIEW SET** NOT FOR CONSTRUCTION



4. SOUTHERN CORNER OF ANIMAL SHELTER FACING NORTHWEST

SOUTHERN EXTENT OF ANIMAL SHELTER FACING NORTHWEST







5. WESTERN EXTENT OF ANIMAL SHELTER FACING NORTHEAST

- NOTES

  1) CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL DEMOLISHED BUILDINGS MATERIALS. FOR DETAILS REGARDING DEMOLITION OF EXISTING BUILDINGS SEE SPECIFICATION SECTION 02050.

  2) A HAZARDOUS BUILDING MATERIALS SURVEY WAS COMPLETED BY CDW CONSULTANTS ON AUGUST 10, 2021 AND IS PROVIDED IN APPENDIX D OF THE SPECIFICATIONS.

  3) ELECTRIC, WATER, AND NATURAL GAS SERVICES TO THE EXISTING BUILDINGS HAVE BEEN DECOMMISSIONED AND INTERIOR UTILITIES HAVE BEEN ABANDONED IN PLACE.



One Beacon Street, Suite 8100 Boston, MA 02108 Phone: 617-497-7800 www.kleinfelder.com

	REVISIONS			
REV	DESCRIPTION	DSN	СНК	DATE
LV	DESCRIPTION	DWN	APP	DATE



SCALE VERIFICATION

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IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

FORMER ANIMAL SHELTER BUILDING DEMOLITION

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



TOWN OF MILLIS DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 900 MAIN ST, MILLIS, MA 02054

#### 60% DESIGN

PROJECT NO. 20212063.003A ISSUE DATE SEPT. 2021 CURRENT REVISION DESIGNED BY DRAWN BY CHECKED BY PPROVED BY FC SHEET

**REVIEW SET** NOT FOR CONSTRUCTION

D-2

#### **GENERAL NOTES**

- ALL WORK TO BE NEW U.O.N.
  ALL WORK SHALL COMPLY WITH FEDERAL,
  STATE, AND LOCAL BUILDING REGULATIONS.
  ANY CONFLICTS BETWEEN SITE CONDITIONS
  AND DRAWINGS SHALL BE BROUGHT TO THE
  IMMEDIATE ATTENTION OF THE OWNER AND
  ARCHITECT/DESIGNER.
  ALL DOORS TO BE A MINIMUM OF 4" FROM
  NEAREST PERPENDICULAR PARTITION, U.O.N.
  TEMPERED GLASS TO BE USED IN ALL
  LOCATIONS AS REQUIRED BY
- LOCATIONS AS REQUIRED BY MASSACHUSETTS STATE BUILDING CODE -
- REVIEW LAYOUTS FOR PARTITIONS IN FIELD
- GIMP (180.

  REVIEW LAYOUTS FOR PARTITIONS IN FIELD WITH THE OWNER AND ARCHITECT/DESIGNER PRIOR TO START OF CONSTRUCTION.

  PROVIDE FIRE EXTINGUISHERS (WITH CABINETS) IN QUANTITIES AND LOCATIONS ON DWGS (MIN 1/6000 SQ-FT & 75 MAX TRAVEL DISTANCE). REVIEW FINAL LOCATIONS WITH THE ARCHITECT/DESIGNER PRIOR TO START OF CONSTRUCTION.

  COORDINATE BLOCKING REQUIREMENTS AND LOCATIONS WITH ELEVATIONS AND DETAILS.

  ALL WOOD BLOCKING TO BE FIRE TREATED.

  ALIGN CENTERLINES OF ALL FIRE EXTINGUISHER CABINETS AND MEP/FP DEVICES ON WALLS IN THE SAME LOCATION.

  DISCLAIMER: MANUFACTURERS REFERENCES ARE INTENDED TO ESTABLISH COLOR AND FINISH ONLY, AND ARE NOT INTENDED TO
- FINISH ONLY, AND ARE NOT INTENDED TO LIMIT SELECTIONS FROM OTHER MANUFACTURERS. WHEN ALTERNATE SELECTIONS ARE SUBMITTED, SUBMITTAL
- SHALL INCLUDE MATERIALS LISTED FOR COMPARISON.
  - COMPARISON.
    DIMENSIONS:
    A. ALL DIMENSIONS ARE TO FINISHED
    FACE OF WALL U.O.N.
    B. DRAWINGS ARE NOT TO BE SCALED;
    VERIFY ANY MISSING OR CONFLICTING
    WRITTEN DIMENSIONS WITH THE
    ARCHITECT/ DESIGNER PRIOR TO
  - NOTIFY ARCHITECT OF CONDITIONS WHERE CLEAR OR CRITICAL DIMENSIONS ARE DESIGNATED BUT CANNOT BE MET OR WHERE CORRIDOR/AISLE WIDTH CANNOT MEET THE MINIMUM REQUIREMENTS
  - (3'-8" U.O.N.) MAINTAIN FINISH FLOOR BASE MAINTAIN FINISH FLOOR BASE ELEVATION THROUGHOUT THE CONTRACT AREA SUCH THAT ALL DIMENSIONS INDICATED AS ABOVE FINISH FLOOR ARE AT THE SAME ELEVATION.

#### SYMBOLS LEGEND

( 0

COLUMN GRID LINE



TOILET ACCESSORY TAG



DETAIL MARKER

CENTER LINE



DOOR TAG









ROOM IDENTIFICATION



WINDOW TAG

WALL TAG

## (1t)

# MATERIALS LEGEND









PLYWOOD



RIGID INSULATION



SAND, CEMENT, GROUT



CERAMIC TILE





SHINGLE





SMOKE SEALANT



SPRAYED FIREPROOFING



GRAVEL

ECECECE ECECECE

EARTH



WOOD

STEEL

#### **ABBREVIATIONS**

East
Each
Expansion Bolt
Exhaust Fan
Expansion Joint
Elevation
Electrical
Engineer
Entrance
Electrical Panel
Foual

Equipment Exterior Soffit Board

Easement Existing to Remain

Electric Water Cooler Existing Excavate Exhaust

Expansion Exterior

EL ELEC ENGR ENTR EP EQ EQUIP ESB ESMT ETR EWC EX/EXST

9	And	FCO	Floor Clean Out	ME	Metal Flashing
& @	And At	FD	Floor Drain	MFR	Manufacturer
A/E	Architect / Engineer	FDN	Foundation	MH	Manhole
A/E AB	Anchor Bolt	FE	Fire Extinguisher	MIN	Minimum
AC.	Air Conditioning	FEC	Fire Extinguisher Cabinet	MIR	Mirror
	Air Conditioning	FF	Fabric Flashing	MISC	
ACT ACP	Acoustic Ceiling Tile	FGL	Fiberglass	MLDG	Miscellaneous Molding
	Acoustic Ceiling Panel	FHC			Manager
AD	Access Door		Fire Hose Cabinet	MO	Masonry Opening
ADH	Adhesive	FHY	Fire Hydrant	MS	Metal Stud
ADJ	Adjustable	FIN	Finished	MTD	Mounted
ADJC	Adjacent	FL	Floor	MTL	Metal
AFF	Above Finished Floor	FLUOR	Fluorescent	MTR	Mortar
AH	Air Handler	FOC	Face of Concrete	MULL	Mullion
AL	Aluminum	FOF	Face of Finish	MVBL	Movable
ALT	Alternate	FOM	Face of Masonry		
ANOD	Anodized	FR	Fire Resistant	N	North
APP	Approximately	FPRF	Fireproofing	NA	Not Applicable
ARCH	Architectural	FRP	Fiber Reinforced Plastic	NAT	Natural
ASPH	Asphalt	FS	Full Size	NIC	Not In Contract
	•	FT	Foot or Feet	NO	Number
BD	Board	FTG	Footing	NOM	Nominal
BETW	Between	FTR	Fin Tube Radiation	NTS	Not To Scale
BIT	Bituminous	FURN	Furniture		
BLDG	Building	FURR	Furring	OA	Overall
BLKG	Blocking	FV	Field Verify	OC	On Center
BM	Beam	FWC	Fabric Wall Covering	OD	Outside Diameter
BO	By Others		r abno rran coronng	OF	Outside Face
BOT	Bottom	G	Gas	OFF	Office
BP	Building Paper	GA	Gauge	OH	Overhead
BR	Brass	GALV	Galvanized	OPNG	Opening
BRZ	Bronze	GB	Grab Bar	OPHD	Opposite Hand
BU	Built Up	GC	General Contractor	OPP	Opposite
ВО	Built Up			UPP	Opposite
		GEN	Generator	D00	B 0.0: 1
С	Course	GL	Glass	P&S	Power & Signal
С	Center Line	GLMU	Glass Masonry Unit	PAR	Parallel
ÇAB CEM	Cabinet	GND	Ground	PART	Partition
CEM	Cement	GR	Grade	PC	Precast
CG	Corner Guard	GRL	Grille	PERF	Perforated
CPT	Carpet	GRTG	Grating	PERP	Perpendicular
CHAN	Channel	GSKT	Gasket	PL	Plate
CHBD	Chalkboard	GT	Grout	PLAM	Plastic Laminate
CHFR	Chamfer	GVL	Gravel	PM	Pressed Metal
CHR	Chrome	GWB	Gypsum Wall Board	PNL	Panel
CI	Cast Iron			PRMT	Perimeter
CJ	Control Joint	HB	Hose Bibb	PT	Pressure Treated
CL	Closet	HC	Handicapped	PTD	Painted
CLG	Ceiling	HDW	Hardware	PVG	Paving
CLR	Clearance	HGT	Height	PWD	Plywood
CMPST	Composite	HM	Hollow Metal		,
CMU	Concrete Masonry Unit	HMD	Hollow Metal Door	OT	Quarry Tile
CNTR	Counter	HNDRL	Handrail	QTY	Quantity
COL	Column	НО	Hold Open		
COMP	Compressible	HORIZ	Horizontal	R	Radius or (Stair) Risers
CONC	Concrete	HP	High Point	RAD	Radiator
CONN	Connection	HR	Hour	RCP	Reflected Ceiling Plan
CONSTR	Construction	HVAC	Heat, Ventilation & Air Conditioning	RD	Roof Drain
CONT	Continuous	111710	ricat, vertilation a Air Goriationing	REC	Recessed
CONTR	Contractor	ID	Inside Diameter	REF	Reference
COP	Copper	IF.	Inside Diameter	REFR	Refrigerator
CORR	Copper	IF IN	Inch or Inches	REINF	Reinforcing
CT	Ceramic Tile	INSUL	Insulation	REM	Removable
CW	Curtain Wall	INT	Interior	REQD	Required
CVV	Curtain waii	IINI	interior	REQMTS	Requirements
Ø	Diameter	JAN	Janitor	RESIL	Resilient
DBL	Diameter	JAN	Joint	RESIL	Resilient Rigid Foam Insulation
		JINI	Joint		Rigid Foam insulation
DEMO DIA	Demolition	KD	K 1 15	RFG	Roofing
	Diameter	KD KIT	Knocked Down Kitchen	RH	Right Hand
DIV	Division	KII	Kitchen	RM	Room
DIM	Dimension			RO	Rough Opening
DMPF	Dampproofing	L_	Left	RV	Roof Vent
DN	Down	LF	Linear Foot		
DOP	Door Opening	LG	Length	S	South
DR	Door	LAD	Ladder	SAFB	Sound Attenuation Fiber Blanket
DS	Downspout	LAM	Laminate	SC	Sealed Concrete
DSP	Dry Standpipe	LAV	Lavatory	SCHED	Schedule
DTL	Detail	LB	Pound	SCR	Screw
DWG	Drawing	LBL	Label	SCRN	Screen
	-	LCC	Lead Coated Copper	SD	Soap Dispenser
E	East	LH	Left Hand	SECT	Section
EA	Each	LHR	Left Hand Reverse	SF	Square Foot
EB	Expansion Bolt	LIN	Linear	SGL	Single
EF	Exhaust Fan	LKR	Locker	SHT	Sheet
ĒJ	Expansion Joint	LNTL	Lintel	SHTHG	Sheathing
EL	Elevation	LONG	Longitudinal	SHV	Shelving
FLEC	Flectrical	I P	Low Point	SIM	Similar

Lintel
Longitudinal
Low Point
Light
Lightweight
Lighting
Louver

Maintenance Manufacturer

Maximum Medium Density Overlay

Masonry Material

Mechanical

Medium

LP LT LTWT LTG LVR

MAS MATL MAX MDO

MECH MED MEMB

Sheathing Shelving Similar Sink Sheet Metal Spray Particle Paint Specifications

Square Stainless Steel

Suspended Sheet Vinyl Flooring

Standard Steel

Storage Structural

Symbol

Symmetrical System Surface Four Sides

T&G
TB
TBD
TDO
TEMP
TEL
TERR
THRK
THRU
T&G
T.O.
TOM
TOS
TOW
TRANS
TYP Through Tongue and Groove Top Of Top Of Concrete Top Of Masonry Top Of Steel Top Of Wall Translucent Typical UL UNFIN UNO / UON UR UV Underwriters Laboratory Unfinished Unless Otherwise Noted Unit Ventilator VB VT / VCT VEN VERT VERT VIF VNR VR VWC Vapor Barrier or Vinyl Base Vinyl Composition Tile Veneer Verify Vertical Vestibule
Verify In Field
Veneer
Vapor Retarder
Vinyl Wall Covering Wired Glass Working Point WTRPRF

Treads (Stairs)
Tongue and Groove
Tobble Bolt
To Be Determined
Thermoset Decorative Overlay (Melamine)
Tempered / Temporary
Telephone

Threshold



REVISIONS

DSN CHK
DWN APP DESCRIPTION DATE

> SCALE VERIFICATION THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

SCALE AS NOTED

ORIGINAL DRAWING SIZE IS 22 x 34 GENERAL NOTES, LEGENDS &

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



TOWN OF MILLIS DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 900 MAIN ST, MILLIS, MA 02054

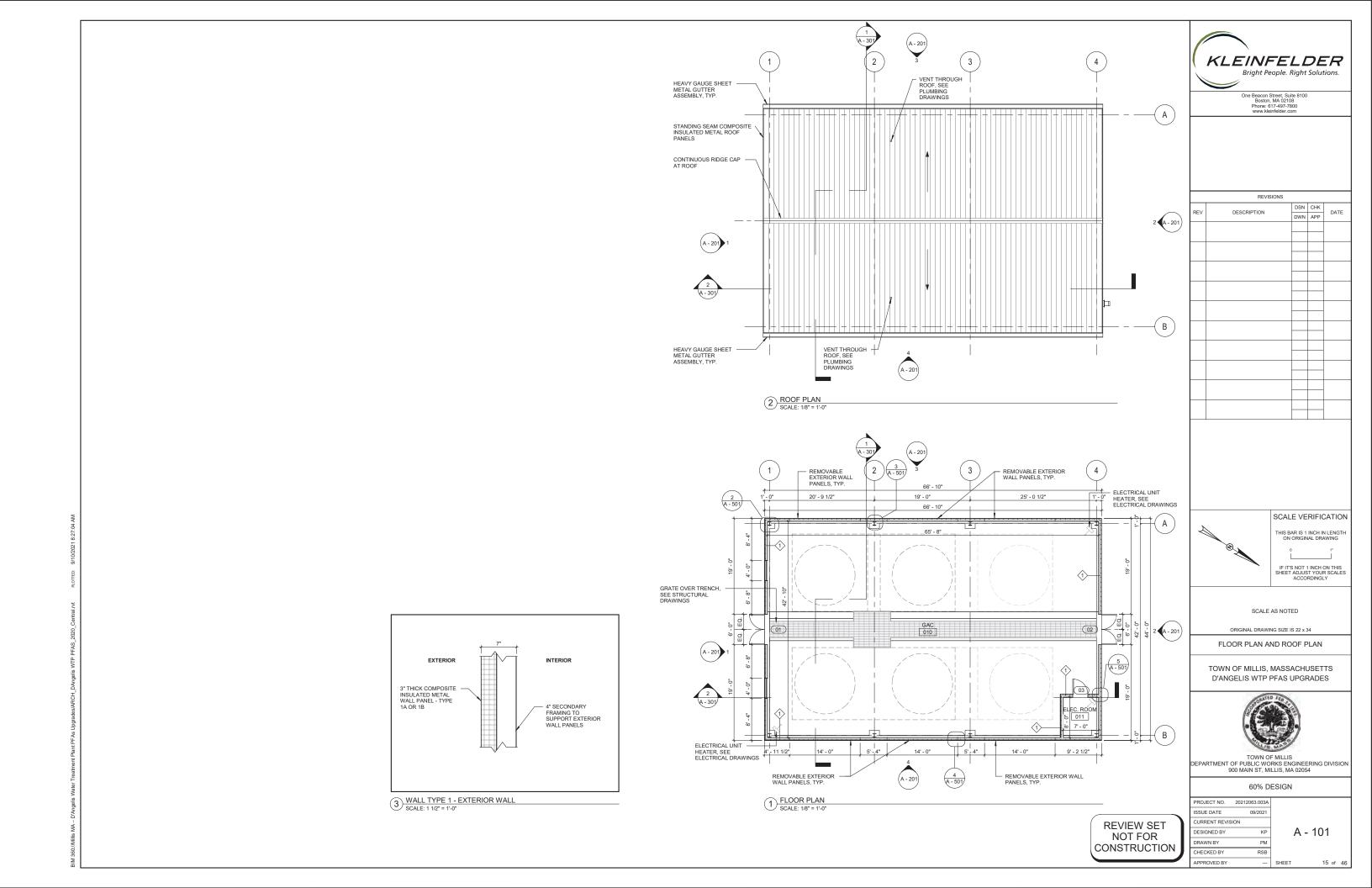
60% DESIGN

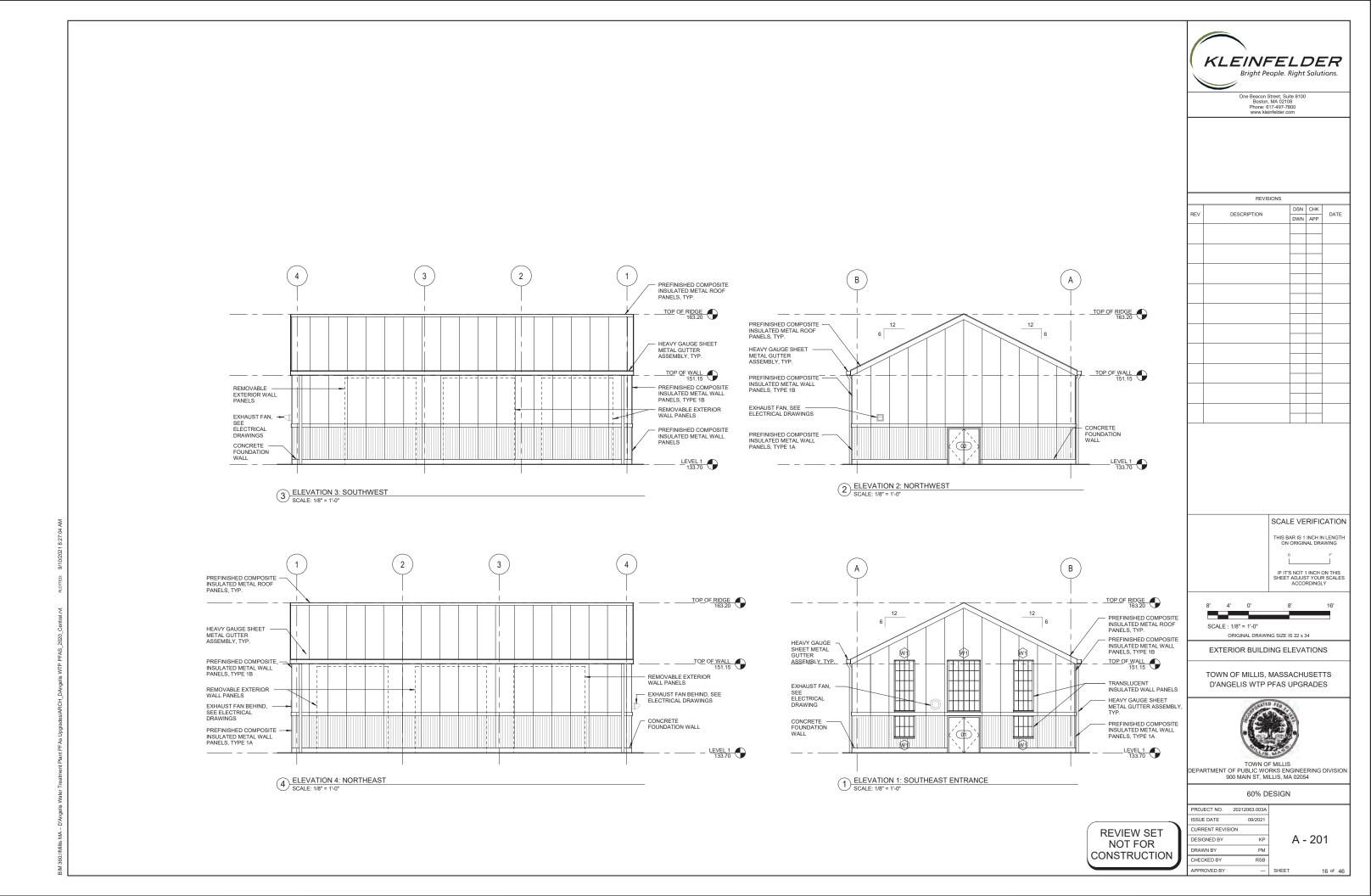
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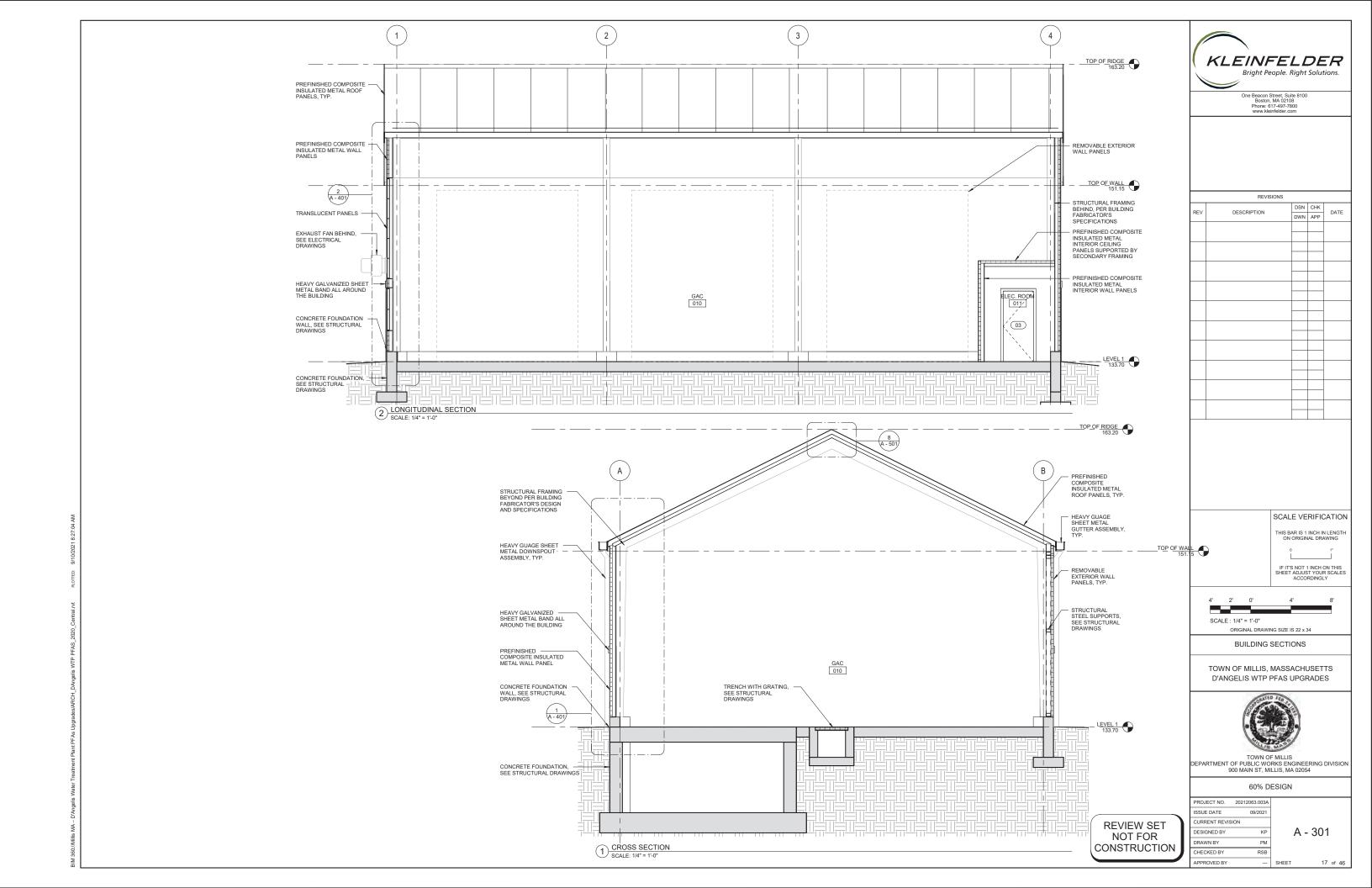
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SHEET 14 of 46

**REVIEW SET** NOT FOR CONSTRUCTION

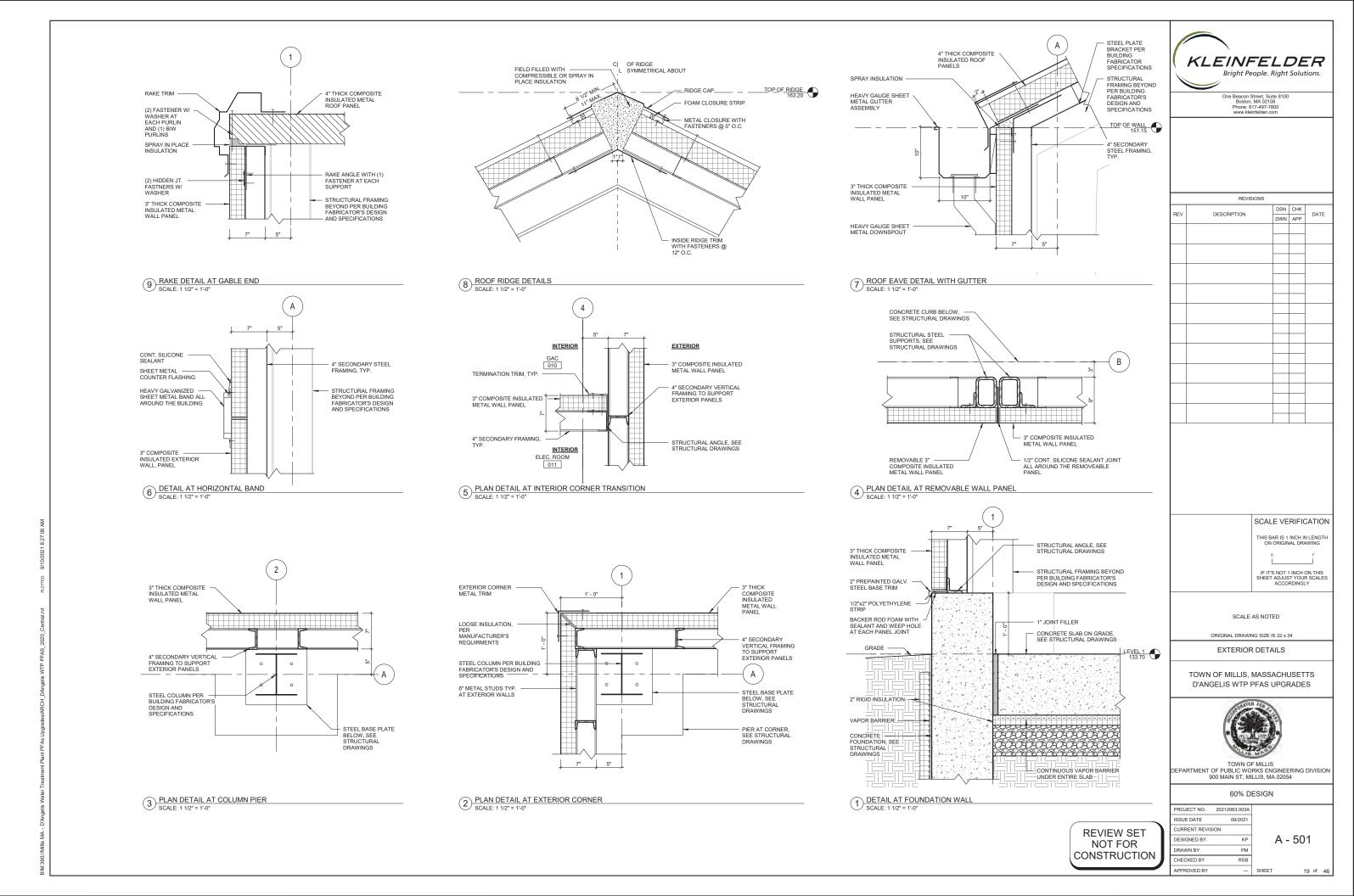




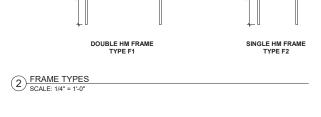


KLEINFELDER Bright People. Right Solutions. One Beacon Street, Suite 8100 Boston, MA 02108 Phone: 617-497-7800 www.kleinfelder.com REVISIONS DSN CHK
DWN APP DESCRIPTION 4" THICK COMPOSITE INSULATED METAL ROOF PANEL RAKE TRIM 4" SECONDARY STEEL FRAMING, TYP. 4" THICK COMPOSITE ——INSULATED ROOF PANELS ( A STRUCTURAL FRAMING BEYOND PER BUILDING FABRICATOR'S DESIGN AND SPECIFICATIONS SPRAY INSULATION TOP OF WALL 151.15 - STEEL PLATE BRACKET PER BUILDING FABRICATOR'S SPECIFICATIONS HEAVY GAUGE SHEET METAL |
GUTTER ASSEMBLY - STRUCTURAL FRAMING BEYOND PER BUILDING FABRICATOR'S DESIGN AND SPECIFICATIONS HEAVY GAUGE SHEET -METAL DOWNSPOUT - 4" SECONDARY STEEL FRAMING, TYP. 3" THICK COMPOSITE INSULATED METAL WALL PANEL TRANSLUCENT PANELS -SHEET METAL COUNTER FLASHING SCALE VERIFICATION HEAVY GALVANIZED SHEET METAL BAND ALL AROUND THE BUILDING 6 A - 501 - STEEL COLUMN BEHIND, SEE STRUCTURAL DRAWINGS IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY HEAVY GALVANIZED — SHEET METAL BAND ALL AROUND THE BUILDING TRANSLUCENT PANELS -SCALE : 1/2" = 1'-0" ORIGINAL DRAWING SIZE IS 22 x 34 STRUCTURAL ANGLE, SEE STRUCTURAL DRAWINGS WALL SECTIONS STRUCTURAL ANGLE, SEE STRUCTURAL DRAWINGS 2" PREPAINTED GALV. STEEL BASE TRIM CONCRETE SLAB ON GRADE, SEE STRUCTURAL DRAWINGS TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES 2" PREPAINTED GALV STEEL BASE TRIM - CONCRETE SLAB ON GRADE, SEE STRUCTURAL DRAWINGS A - 501 GRADE GRADE 133.70 2" RIGID INSULATION 1" JOINT SEALANT CONTINUOUS VAPOR
BARRIER UNDER ENTIRE
SLAB CONCRETE FOUNDATION, SEE STRUCTURAL DRAWINGS 2" RIGID —— INSULATION CONCRETE FOUNDATION, SEE STRUCTURAL DRAWINGS CONT. VAPOR BARRIER TOWN OF MILLIS DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 900 MAIN ST, MILLIS, MA 02054 60% DESIGN (2) WALL SECTION AT TRANSLUCENT INSULATED PANEL SCALE: 1/2" = 1"-0" TYPICAL WALL SECTION
SCALE: 1/2" = 1'-0" SSUE DATE 09/2021 CURRENT REVISION **REVIEW SET** DESIGNED BY A - 401 NOT FOR DRAWN BY PM CONSTRUCTION CHECKED BY

PROVED BY



PTD. HOLLOW METAL DOOR FRAME



SEE SCHED.

PTD. HOLLOW METAL DOOR FRAME

TRANSLUCENT PANEL

SHEET METAL SILL FLASHING, TYP.

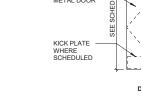
PREPAINTED GALV. STEEL TRANSITION TRIM, TYP.

3" THICK COMPOSITE — INSULATED METAL WALL

HM DOOR -INSULATED

TRANSLUCENT PANEL SILL DETAIL
SCALE: 3" = 1'-0"

5 DOOR JAMB DETAIL (LOW WALL)
SCALE: 3" = 1'-0"



DOOR TYPES
SCALE: 1/4" = 1'-0"

- CONCRETE FOUNDATION WALL, SEE STRUCTURAL DRAWINGS

EE SCHED. SLE HM DO

PTD. HOLLOW OH OF THE PROPERTY	SEE SCHED.	PTD. HOLLOW METAL DOOR G
KICK PLATE WHERE SCHEDULED	50 - 15	KICK PLATE WHERE SCHEDULED
	DOUBLE DOOR	SINGLI

1/2" SEALANT AND BACKER ROD ALONG PERIMETER OF OPENING, BOTH SIDES, TYP.

PANEL ATTACHMENT PER -MANUFACTURER'S INSTRUCTIONS

HM DOOR INSULATED

PTD. STEEL DOOR FRAME

ANCHOR (3) PER JAMB -1/2" SEALANT AND BACKER -ROD ALONG PERIMETER OF OPENING, BOTH SIDES

SPRAY FOAM INSULATION

DOOR JAMB DETAIL (HIGH WALL)
SCALE: 3" = 1'-0"

7 TRANSLUCENT PANEL JAMB DETAIL SCALE: 3" = 1'-0"

TRANSLUCENT PANEL

PANEL ATTACHMENT PER MANUFACTURER'S INSTRUCTIONS

METAL GIRT, SEE STRUCTURAL DRAWINGS

- 4" STUD SECONDARY FRAMING AT EXTERIOR WALL, TYP.

1/2" SEALANT AND — BACKER ROD ALONG

PERIMETER OF OPENING, BOTH SIDES

GROUT SOLID

PTD. STEEL DOOR FRAME ANCHORS, 3 PER JAMB -

SEE SCHED

PREPAINTED GALV. STEEL TRANSITION TRIM, TYP.

4" STUD SECONDARY FRAMING AT EXTERIOR WALL, TYP.

- SPRAY FOAM INSULATION

3" THICK COMPOSITE INSULATED METAL WALL PANEL

4" STUD SECONDARY FRAMING AT EXTERIOR WALL, TYP.

CONCRETE FOUNDATION WALL BELOW, SEE STRUCTURAL DRAWINGS

- 3" THICK COMPOSITE INSULATED METAL WALL PANEL

3" THICK COMPOSITE INSULATED METAL WALL PANEL

PREPAINTED GALV. STEEL TRANSITION TRIM, TYP.

METAL FLASHING, TYP.

PTD. HOLLOW METAL DOOR	SEE SCHED.
KICK PLATE — WHERE SCHEDULED	3. G.
	CINICI E LIM DOOD

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./	W1	6' -	6"
→+			
9			
	RO		-
	NO	J.	RC
•	010		GAG
IM DOOR	011		ELE

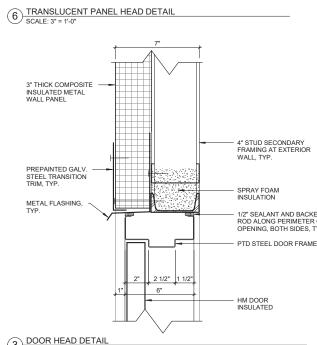
	ROOM FINISH SCHEDULE									
	ROOM FINISH SCHEDULE									
ROOM										
NO.	ROOM NAME	FLOOR N	ΛΑT.		WALL	MAT.		CEILI	NG MAT.	
010	GAC	SEALED CON	NCRETE	SEALED	CONC./ PTD.	STRUCT./ MTL.	PANEL	FINISHED PAN	EL/ PTD. S	STRUCT.
011	ELEC. ROOM	SEALED CON	NCRETE	SEALED	CONC./ PTD.	STRUCT./ MTL.	PANEL	FINISHED PAN	EL/ PTD. S	STRUCT.

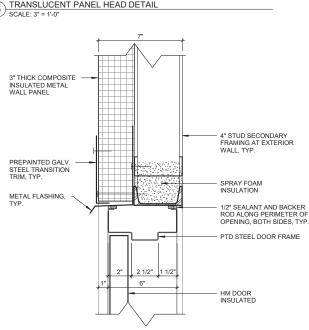
	WINDOW SCHEDULE									
NO	WINDO	W SIZE						Glazing		
	WIDTH	HEIGHT	MAT.	HEAD	JAMB	SILL	THICKNESS	TYPE	HEAD HT.	REMARKS
W1	4' - 0"	4' - 3"	ALUM	6/A-601	7/A-601	8/A-601		TRANSLUNCENT PANEL	7' - 4"	
W1	4' - 0"	10' - 0"	ALUM	6/A-601	7/A-601	8/A-601		TRANSLUNCENT PANEL	18' - 2 3/4"	
W1	4' - 0"	4' - 3"	ALUM	6/A-601	7/A-601	8/A-601		TRANSLUNCENT PANEL	7' - 4"	
W1	4' - 0"	10' - 0"	ALUM	6/A-601	7/A-601	8/A-601		TRANSLUNCENT PANEL	18' - 2 3/4"	
W1	6' - 6"	10' - 0"	ALUM	6/A-601	7/A-601	8/A-601		TRANSLUNCENT PANEL	18' - 2 3/4"	

	DOOR SCHEDULE								
NO	DOOR	SIZE	DO	OR	FRAME	DE	TAILS	HARDWARE	
	HEIGHT	WIDTH	TYPE	MAT	TYPE	HEAD	JAMB	SET	REMARKS
01	7' - 0"	6' - 0"	Α	НМ	F1	3/A-601	4-5/A-601	-	DOUBLE
02	7' - 0"	6' - 0"	Α	НМ	F1	3/A-601	4-5/A-601	-	DOUBLE
03	7' - 0"	3' - 0"	В	НМ	F2	3/A-601	4-5/A-601	-	SINGLE
04	7' - 0"	6' - 0"	Α	HM	F1	3/A-601	4-5/A-601	-	DOUBLE
05	7' - 0"	6' - 0"	Α	НМ	F1	3/A-601	4-5/A-601	-	DOUBLE

(	SCALE	E: 3" = 1'-0"							
					DOOR S	SCHEDUL	.E		
NO	DOOR	SIZE	DO	OR	FRAME	DE	TAILS	HARDWARE	
	HEIGHT	WIDTH	TYPE	MAT	TYPE	HEAD	JAMB	SET	REMARKS
01	7' - 0"	6' - 0"	Α	НМ	F1	3/A-601	4-5/A-601	-	DOUBLE
02	7' - 0"	6' - 0"	Α	НМ	F1	3/A-601	4-5/A-601	-	DOUBLE
03	7' - 0"	3' - 0"	В	НМ	F2	3/A-601	4-5/A-601	-	SINGLE
04	7' - 0"	6' - 0"	Α	HM	F1	3/A-601	4-5/A-601	-	DOUBLE
05	7' - 0"	6' - 0"	Α	НМ	F1	3/A-601	4-5/A-601	-	DOUBLE

3" THICK COMPOSITE		
PREPAINTED GALV. STEEL TRANSITION TRIM, TYP. METAL FLASHING, TYP.		4" STUD SECONDARY FRAMING AT EXTERIOR WALL, TYP.  SPRAY FOAM INSULATION  1/2" SEALANT AND BACKER ROD ALONG PERIMETER O
		OPENING, BOTH SIDES, TYPE PTD STEEL DOOR FRAME
	2" 2 1/2" 1 1/2"	HM DOOR INSULATED





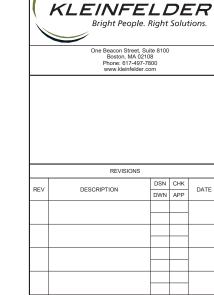
4" STUD SECONDARY FRAMING

AT EXTERIOR WALL, TYP.

SPRAY FOAM INSULATION

- 1/2" SEALANT AND BACKER ROD ALONG PERIMETER OF OPENING, BOTH SIDES, TYP.

- PANEL ATTACHMENT PER MANUFACTURER'S INSTRUCTIONS TRANSLUCENT PANEL



SCALE VEI	RIFICA	TION
0	1	I
SHEET ADJUST	T YOUR S	
	THIS BAR IS 1 ON ORIGIN   IF IT'S NOT 1 SHEET ADJUS'	SCALE VERIFICA  THIS BAR IS 1 INCH IN LE ON ORIGINAL DRAWI    IF IT'S NOT 1 INCH ON SHEET ADJUST YOUR'S ACCORDINGLY

SCALE AS NOTED

ORIGINAL DRAWING SIZE IS 22 x 34

DOOR SCHEDULE AND DETAILS

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



TOWN OF MILLIS EPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 900 MAIN ST, MILLIS, MA 02054

60% DESIGN	6	60%	DESIGN
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PROJECT NO.	20212063.003A
ISSUE DATE	09/2021
CURRENT REVIS	SION
DESIGNED BY	KP
DRAWN BY	PM
CHECKED BY	RSB
ADDDOVED BY	

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SHEET

IAPER	
	REVIEW SET
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	CONSTRUCTION

- 3. CONTRACTOR MUST PROVIDE ALL MATERIAL, LABOR, EQUIPMENT, CONSUMABLES, AND ALL OTHER ITEMS REQUIRED TO COMPLETE THE WORK AS SPECIFIED ON THE DESIGN DRAWINGS, PROJECT SPECIFICATIONS, AND AS NECESSARY TO COMPLETE THE WORK.
- 4 CONTRACTOR MUST VISIT THE PROJECT SITE AND OBSERVE CONDITIONS FOR THE PROPOSED CONSTRUCTION ANY DISCREPANCY BETWEEN THE DESIGN DRAWINGS AND ACTUAL SITE CONDITIONS MUST BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ENGINEER, IN WRITING, FOR RESOLUTION PRIOR TO COMMENCEMENT OF THE
- 5. COMPLETED SHOP DRAWINGS FOR ALL WORK MUST BE SUBMITTED FOR REVIEW AND APPROVAL PRIOR TO THE START OF FABRICATION AND CONSTRUCTION ACTIVITIES.
- 6. UNLESS NOTED OTHERWISE ON THE DESIGN DRAWINGS, ALL DESIGN, MATERIALS, FABRICATION, TESTING, AND CONSTRUCTION MUST COMPLY WITH THE FOLLOWING NOTES, REFERENCED CODES, SPECIFICATIONS AND STANDARDS SHOPLICH THESE NOTES, CODES, SPECIFICATIONS OR STANDARDS CONFLICT, THE STRICTEST PROVISION MUST GOVERN UNTIL WRITTEN CLARIFICATION IS PROVIDED TO THE CONTRACTOR.
- 7. THE STRUCTURAL DRAWINGS MUST BE USED IN CONJUNCTION WITH ALL OTHER DESIGN DRAWINGS AND SPECIFICATIONS. REFER TO PROCESS EQUIPMENT, ARCHITECTURAL, CIVIL, MECHANICAL, HVAC, PLUMBING, ELECTRICAL, AND PIER PROTECTION DRAWINGS FOR LOCATIONS, DIMENSIONS, AND DETAILS OF OPENINGS, SLEEVES, EMBEDMENTS, AND EQUIPMENT INSERTS, PADS, CURBS, DEPRESSIONS, ANCHOR BOLTS, EXTERIOR GRADING AND OTHER PROJECT REQUIREMENTS NOT SPECIFIED ON STRUCTURAL DRAWINGS
- 8 THE CONTRACTOR SHALL ORDAIN HISTORICAL DRAWINGS REPORTS AND SPECIFICATIONS OF THE EXISTING . THE CONTRACTOR SHALL OBTAIN HISTORICAL DRAWINGS, REPORTS, AND SPECIFICATIONS OF THE EXISTING STRUCTURES CONSTRUCTION FROM THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING IN THE FIELD THE ACCURACY OF ALL RELEVANT INFORMATION SPECIFIED ON THE HISTORIC DOCUMENTS, INCLUDING BUT NOT LIMITED, TO STRUCTURAL SUBSTRUCTURE AND SUPERSTRUCTURE CONDITIONS AND THE EXISTENCE OF OVERHEAD, BURIED AND/OR EMBEDDED UTILITIES. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS, ELEVATIONS AND DIMENSIONS PRIOR TO FABRICATING NEW WORK THAT WILL BE CONNECTED TO EXISTING CONSTRUCTION.
- 9. STRUCTURAL REQUIREMENTS TO SECURE FIXED EQUIPMENT, INCLUDING BUT NOT LIMITED TO ROOF TOP UNITS, MONO-RAIL CRANE, AND ELEVATOR HOISTWAYS, AND EQUIPMENT PIT DIMENSIONS AND EMBEDMENTS, ARE INCIDENTAL TO THE REQUIREMENTS OF A SPECIFIC EQUIPMENT MANUFACTURER. ALL WORK MUST CONFORM TO APPROVED EQUIPMENT MANUFACTURER'S SHOP DRAWINGS AND INSTALLATION INSTRUCTIONS. THE CONTRACTOR MUST SUBMIT TO THE ENGINEER FOR REVIEW AND APPROVAL ANY REQUIRED MODIFICATIONS TO ACCOMMODATE APPROVED EQUIPMENT. SUCH MODIFICATIONS MUST BE MADE AT NO COST TO THE OWNER.

#### B. PROTECTION OF EXISTING STRUCTURES NOTES

1. EXISTING STRUCTURES, CONDUITS, UTILITY LINES AND OTHER UTILITIES MUST BE IDENTIFIED BY THE OWNER AND CONTRACTOR AND CLEARLY MARKED ON-SITE PRIOR TO INITIATING CONSTRUCTION. IN THE EVENT THAT ANY UNMARKED OR UNKNOWN STRUCTURE/UTILITY ARE UNCOVERED BY THE CONTRACTOR, WORK MUST HALT AND THE CONTRACTOR MUST REPORT ITS FINDINGS TO THE OWNER'S SITE REPRESENTATIVE FOR INSTRUCTIONS BEFORE PROCEEDING FURTHER. THE EXISTING STRUCTURES AND UTILITIES WHICH ARE ADJACENT TO THE SITE AND THOSE TO REMAIN WITHIN THE LIMITS OF THE WORK MUST BE PRICTE AGAINST DAMAGE. THE CONTRACTOR WILL BE FULLY RESPONSIBLE IN THE EVENT OF REMOVAL OF OR DAMAGE TO ANY EXISTING OBJECTS BY THE CONTRACTOR'S PERSONNEL WHICH ARE INTENDED BY THE OWNER TO REMAIN IN PLACE

#### C. DESIGN CRITERIA NOTES

1. STRUCTURES ARE DESIGNED IN ACCORDANCE WITH THE MASSACHUSETTS STATE BUILDING CODE. 9TH EDITION.

2. DEAD LOAD: 

3. LIVE LOAD:	
STAIR AND EXITWAYS	100 PS
SIDEWALKS AND DRIVEWAYS	250 PS
LIGHT STORAGE	. 125 PS
HEAVY STORAGE	. 250 PS
FLOOR PLATES AND GRADING	. 100 PS
WALKWAYS AND ELEVATED PLATFORMS	. 60 PS
MECHANICAL ROOM	. 150 PS

4. ROOF LIVE LOAD

5. SNOW LC		
	D SNOW	
FLAT-RO	OOF SNOW 1	P <sub>f</sub> =
EXPOSI	JRE FACTOR	C <sub>e</sub> =
	AL FACTOR	
IMPORT	ANCE FACTOR	l <sub>s</sub> =
SLOPE I	FACTOR	C <sub>s</sub> =
DRIFT S	URCHARGE	Pd =
DRIFT V	VIDTH	W =
<ol><li>WIND LOA</li></ol>	√D:	

6. WIND LOAD:	
RISK CATEGORY	III
ULTIMATE WIND SPEED	V <sub>ULT</sub> =
NOMINAL WIND SPEED	Vasd =
EXPOSURE CATEGORY	C
DIRECTIONALITY FACTOR	K <sub>d</sub> =
GUST EFFECT FACTOR	G =
TOPOGRAPHIC FACTOR	K <sub>2t</sub> =
INTERNAL PRESSURE COEFFICIENT	C <sub>1</sub> C <sub>p</sub> :
7. SEISMIC LOAD:	
RISK CATEGORY	III
IMPORTANCE FACTOR	

INTERNAL PRESSURE COEFFICIENT	C <sub>1</sub> C <sub>p</sub> =
7. SEISMIC LOAD:	
RISK CATEGORY	III
IMPORTANCE FACTOR	l <sub>e</sub> =
SITE CLASSIFICATION	Č
SEISMIC DESIGN CATEGORY	В
RESPONSE MODIFICATION FACTOR	R =
DESIGN SPECTRAL RESPONSES	S <sub>8</sub> =
	S <sub>2</sub> =
	Sns =
	S <sub>D1</sub> =
SEISMIC FORCE RESISTING SYSTEM	SYSTEM NOT SPECIFICALLY DETAILED
	FOR SEISMIC RESISTANCE
SEISMIC FORCE RESISTING SYSTEM	CS =
ANALYSIS PROCEDURE	EQUIVALENT LATERAL FORCE
8 GEOTECHNICAL:	

GEOTECHNICAL INVESTIGATION ON GOING

REFERENCED SOIL PROPERTIES FROM GEOTECHNICAL REPORT ARE AS FOLLOWS:

EFERENCEL SUIT PROPER HIS FROM GEOFECHINAE REPOR APPROXIMATE GROUND WATER ELEVATION BELOW GRADE .. SOIL BEARING CAPACITY (ALLOWABLE) COEFFICIENT OF FRICTION SUBGRADE MODULUS

9. FLOOD:	
DESIGN CLASS	
LOWEST FLOOR ELEVATION	
DRY FLOODPROOFED ELEVATION	

10. RAIN INTENSITY i = 2.71 INCHES PER HR D. STRUCTURAL STEEL NOTES

DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL AND MISCELLANEOUS STEEL MUST BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE FOLLOWING CODES & STANDARDS:

IANUARUS:
a. MASSACHUSETTS STATE BUILDING CODE (9TH EDITION)
b. SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS (ANSI/AISC 360)
c. CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES (AISC 303)
d. SPECIFICATION FOR STRUCTURAL JOINT USING HIGH-STRENGTH BOLTS (RCSC)

e. STRUCTURAL WELDING CODE – STEEL (AWS D1.1) f. STRUCTURAL WELDING CODE – ALUMINUM (AWS D1.2) g. STRUCTURAL WELDING CODE – SHEEF STEEL (AWS D1.3) h. STRUCTURAL WELDING CODE – STAINLESS STEEL (AWS D1.6)

PROJECT SPECIFICATIONS OSHA STANDARDS 1910 & 1926

k. DETAILING FOR STEEL CONSTRUCTION, 3RD EDITION (AISC)

f. HIGH-STRENGTH BOLTS ... g. COMMON BOLTS ..... ASTM F3125, GRADE A325-N ASTM A307 h. NUTS ....... i. WASHERS . ASTM A563 ASTM F436 j. LOAD INDICATING WASHERS ... k. ANCHOR BOLTS ..... ASTM F959 ASTM F1554, GRADE 55

3 THE CONTRACTOR MUST FIELD VERIEV EXISTING CONDITIONS FLEVATIONS AND DIMENSIONS PRIOR TO FABRICATING NEW WORK THAT WILL BE CONNECTED TO EXISTING CONSTRUCTION.

4. CONTRACTOR IS RESPONSIBLE FOR STRUCTURAL STABILITY UNTIL ERECTION IS COMPLETE AND FINAL CONNECTION SECURED. CONTRACTOR MUST PROVIDE TEMPORARY BRACING OF STRUCTURAL FRAMING TO MAINTAIN STABILITY UNTIL PERMANENT BRACING, MOMENT CONNECTIONS AND FLOOR DECKS (DIAPHRAGMS) ARE

5. ALL STRUCTURAL AND MISCELLANEOUS STEEL, UNLESS NOTED OTHERWISE, MUST BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. .

6. WELDING MUST BE PERFORMED IN ACCORDANCE WITH THE APPLICABLE STRUCTURAL WELDING CODE (AWS). ALL WELDING MUST BE PERFORMED BY CERTIFIED WELDERS. WELDED CONNECTION MUST BE MADE UTILIZING E70XX ELECTRODES UNLESS NOTED

7. ALL BUTT WELDS AND GROOVE WELDS MUST BE COMPLETE JOINT PENETRATION WELDS (CJP). FILLET WELDS MUST BE 1/4" MINIMUM UNLESS NOTED OTHERWIS

8. STEEL SURFACES TO BE WELDED MUST BE CLEAN AND FREE FROM OIL, SCALE, SLAG, GREASE, AND OTHER FOREIGN MATERIAL WHICH IS DETRIMENTAL TO WELDING. WHEN WELDING TO EXISTING STRUCTURAL STEEL, MATERIALS MUST BE REMOVED PER THE REQUIREMENTS OF SSPC SP-11 A MINIM OF 4° FROM THE SURFACE TO BE WELDED.

9. BEARING ENDS OF ALL COLUMNS AND STIFFENERS MUST BE FINISHED TO BEAR.

10. GUSSET AND STIFFENER PLATES MUST BE ¾" THICK MINIMUM UNLESS NOTED

11, ALL ASSEMBLY, TIGHTENING AND INSPECTION FOR HIGH-STRENGTH BOLTS MUST BE IN ACCORDANCE WITH THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BULTS (RCSC). TIGHTENING OF STRUCTURAL CONNECTIONS MUST BE BONTS BY TURN-OF-NUT METHOD OR UTILIZING TORQUEED-CONTROLLED (TC) BOLTS. ALL BO FOR END CONNECTIONS OF BEAMS AND BRACING MUST BE FULLY TENSIONED IN

12. UNLESS NOTED OTHERWISE, FIELD CONNECTIONS MUST BE BEARING-TYPE BOLT CONNECTIONS USING ASTM F3125, GRADE A325 GALVANIZED HIGH-STRENGTH BOLTS. BOLT DIAMETER MUST BE ½" DIAMETER, MINIMUM, IN STANDARD HOLES.

13. UNLESS NOTED OTHERWISE, SECONDARY CONNECTIONS (GIRTS, STAIR STRINGERS, LADDERS AND HANDRAILS) MAY BE MADE USING %\* DIAMETER ASTM A307 BOLTS WITH COMPATIBLE NUTS AND WASHERS.

14. ALL GRADE A325 BOLTS ARE TO BE INSTALLED FULLY PRE-TENSIONED AND INSTALLED WITH LOAD INDICATOR WASHERS (SQUIRTER TYPE) AND HARDENED F436 WASHER IN ACCORDANCE WITH TABLE 8.1 OF RCSC.

15. THE CONTRACTOR, OR DESIGNATED REPRESENTATIVE, MUST DESIGN AND PROVIDE FINAL STRUCTURAL CONNECTIONS FOR THE FOLLOWING INSTANCES:

A. FRAMED BEAM END CONNECTION NOT SPECIFICALLY DETAILED ON THE DESIGN

A. FRAMED BEAM END CONNECTION NOT SPECIFICALLY DETAILED OF DRAWINGS

B. RAILING AND RAILING CONNECTIONS TO STRUCTURAL MEMBERS

C. STAIRS AND STAIR CONNECTION TO STRUCTURAL MEMBERS

D. ALUMINUM, LADDERS AND SUPPORTS

E. COLD-FORMED METAL FRAMING.

ALL CONTRACTOR RESPONSIBLE DESIGNS MUST BE PERFORMED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE HAVING AUTHORITY OF THE PROJECT. SUBMITTED CALCULATIONS AND APPLICABLE DRAWING MUST BE SIGNED-AND-SEALED BY THE STRUCTURAL ENGINEER.

E. CAST-IN-PLACE CONCRETE NOTES

1. ALL CONCRETE WORK AND MATERIALS MUST BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND THE CURRENT EDITION OF THE FOLLOWING STANDARDS:

a. MASSACHUSETTS STATE BUILDING CODE (9TH EDITION)

b. GUIDE TO MASS CONCRETE (ACI 207)

c. SPECIFICATIONS FOR STRUCTURAL CONCRETE (ACI 301)

d. HOT WEATHER CONCRETE REQUIREMENTS (ACI 306)

e. COLD WEATHER CONCRETE REQUIREMENTS (ACI 306)

f. BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318)

g. BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318)

g. BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (STRUCTURES (ACI 350))

STRUCTURES (ACI 350)

h. RECOMMENDED PRACTICE FOR PLACING REINFORCING STEEL (CRSI) STRUCTURAL WELDING CODE - REINFORCING STEEL (AWS D1.4)

PROJECT SPECIFICATIONS OSHA STANDARDS 1910 & 1926

. ACI DETAILING MANUAL (SP-66)

2. SHOP DRAWINGS, SHOWING ALL FABRICATION DIMENSIONS AND LOCATIONS FOR PLACING OF THE REINFORCING STEEL AND ACCESSORIES, MUST BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ANY FABRICATION.

3. REINFORCING BARS MUST BE FABRICATED IN ACCORDANCE WITH THE STANDARD FABRICATED TOLERANCES SPECIFIED IN ACI 315, CHAPTER 4.

4. NO ALUMINUM EMBEDMENT IN THE CONCRETE IS PERMITTED

5. ALL EXPOSED CONCRETE EDGES MUST HAVE A 3/4" X 3/4", 45° CHAMFER UNLESS NOTED

6. ALL PERMANENTLY EXPOSED VERTICAL AND HORIZONTAL CONCRETE SURFACES MUST BE TREATED OR SEALED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND CONCRETE FINISH REQUIREMENTS.

7. UNLESS NOTED OTHERWISE STEEL REINFORCEMENT MUST CONFORM TO THE

7. UNLESS NOTED OTHERWISE STEEL REINFORCEMENT MUST CONFORM TO THE FOLLOWING STANDARDS:

a. REINFORCING STEEL MUST BE DEFORMED BILLET STEEL CONFORMING TO ASTM A615, GRADE 60.

b. WELDABLE REINFORCING STEEL MUST BE DEFORMED BILLET STEEL CONFORMING TO ASTM A706, GRADE 60.

c. EPOXY COATED REINFORCING STEEL MUST BE DEFORMED BILLET STEEL CONFORMING TO ASTM A775, GRADE 60.

d. WELD WINE FABRIC (MESH) MUST CONFORM TO ASTM A185 AND MUST BE PROVIDED IN FLAT SHEETS (ROLLS NOT PERMITTED).

e. UNLESS NOTED OTHERWISE ON THE DESIGN DRAWINGS ALL REINFORCING STEEL IS

UNCOATED (PLAIN) DEFORMED BARS. f. TIE ALL REINFORCING STEEL AND EMBEDMENTS SECURELY IN PLACE PRIOR TO

PLACING CONCRETE. PROVIDE SUPPORTS TO MAINTAIN THE POSITION OF REINFORCEMENT WITHIN SPECIFIED TOLERANCES DURING ALL CONSTRUCTION ACTIVITIES. WET "STICKING" DOWELS, ANCHORS, ETC. INTO CONCRETE IS NOT

REINFORCING STEEL MUST BE DETAILED AND FABRICATED IN ACCORDANCE WITH ACI

g. REINFORCING STEEL MUST BE DETAILED AND FABRICATED IN ACCORDANCE WITH ACI 315 'DETAILS AND DETAILING CONCRETE REINFORCEMENT'.
h. UNDIMENSIONED HOOKS AT ENDS OF REINFORCEMENT AND STIRRUPS MUST BE STANDARD HOOKS IN ACCORDANCE WITH ACI 318 UNLESS NOTED OTHERWISE.
i. REINFORCING STEEL MUST BE SPLICED AS SPECIFIED ON THE DESIGN DRAWINGS OR AS APPROVED, IN WRITING, BY THE ENGINEER. WHEN SPLICE LENGTHS ARE NOT SPECIFIED ON THE DESIGN DRAWINGS THEY MUST BE THE MINIMUM LENGTHS DEFINED IN THE 'TENSION LAP SPLICE LENGTH' TABLE. SPLICES NOT DEFINED ON THE DESIGN DRAWINGS MUST BE LAPPED IN ACCORDANCE WITH THE PROVISIONS OF ACI 316 FOR CLASS B SPLICES.
j. REINFORCING STEEL MUST BE CONTINUOUS THROUGH ALL CONSTRUCTION JOINTS, CORNERS, AND INTERSECTIONS UNLESS NOTED OTHERWISE. REINFORCING STEEL

CORNERS, AND INTERSECTIONS UNLESS NOTED OTHERWISE. REINFORCING STEEL MUST NOT BE CONTINUOUS THROUGH SLAE-ON-GRADE CONTROL JOINTS. REINFORCING STEEL MUST BE LAPPED AT NECESSARY SPLICES OR HOOKED AT DISCONTINUOUS END WITH ACI 318 STANDARD HOOKS UNLESS NOTED OTHERWISE. k. FIELD WELDING OF CROSSING BARS BY TACK WELDING IS STRICTLY PROHIBITED. ALL REINFORCING STEEL MUST BE FREE FROM LOSE RUST, SCALE OR ANY FOREIGN MATERIAL PRIOR TO PLACING ANY CONCRETE.

8. PROVIDE ADDITIONAL REINFORCEMENT ALONG EACH SIDE OF OPENINGS AS SPECIFIED IN THE STANDARD DETAILS UNLESS NOTED OTHERWISE.

9. MECHANICAL REINFORCEMENT SPLICES SHALL BE PERMITTED SUBJECT TO THE CONTRACTOR PROPOSED LOCATIONS AND APPROVAL, IN WRITING, BY THE ENGINEER. IN ALL ENGINEER APPROVED INSTANCES, MECHANICAL SPLICES MUST DEVELOP AT A MINIMUM OF 125 PERCENT OF THE SPECIFIED YIELD STRENGTH OF THE REINFORCING BAR.

I.E. CAST-IN-PLACE CONCRETE NOTES CONT. ON NEXT SHEET I



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REVISIONS

REV	DESCRIPTION	DWN	APP	DATE

SCALE VERIFICATION

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

GENERAL NOTES SHEET 1 OF 2

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS PRELIMINARY DESIGN



TOWN OF MILLIS DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISIO 900 MAIN ST, MILLIS, MA 02054

60% DESIGN

PROJECT NO. 20212063.003. ISSUE DATE SEPT. 2021 URRENT REVISION DESIGNED BY DRAWN BY JFC CHECKED BY MNF PPROVED BY

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NOT FOR

CONSTRUCTION

S-001

- 11. UNLESS NOTED OTHERWISE CONSTRUCTION, EXPANSION, AND CONTROL JOINTS MUST CONFORM TO THE FOLLOWING STANDARDS:

  a. HORIZONTAL CONSTRUCTION JOINTS ARE PERMITTED ONLY WHERE SPECIFIED ON THE DESIGN DRAWINGS. ALL OTHERS DEEMED NECESSARY, BY THE CONTRACTOR, MUST BE APPROVED, IN WRITING, BY THE ENGINEER.

  b. THE LOCATION OF VERTICAL CONSTRUCTION JOINTS MUST BE APPROVED, IN WRITING, BY THE ENGINEER. CONSTRUCTION JOINTS MUST BE ROUGHENED TO "A" AMPLITUDE IN ACCORDANCE WITH ICRI CSP STANDARDS.
- AMPLITUDE IN ACCORDANCE WITH ICRI CSP STANDARDS.

  1. UNLESS NOTED OTHERWISE, PLACE VERTICAL CONTROL JOINTS IN RETAINING WALLS AT 20-0" O.C. (MAX.), "V" DEEP, V"-OHAMFERED ON BOTH FACES. CONSTRUCTION JOINTS MUST COINCIDE WITH CONTROL JOINTS.

  1. THE DESIGNATION "C.J." INDICATES A CONSTRUCTION JOINT BETWEEN SUCCESSIVE CONCRETE PLACEMENTS.
- 12. A MINIMUM OF 72 HOURS MUST ELAPSE BETWEEN ADJACENT CONCRETE PLACEMENTS.
- 13. UNLESS NOTED OTHERWISE EMBEDDED ITEMS MUST CONFORM TO THE FOLLOWING
- STANDARDS:

  a. CONCRETE WORK MUST BE COORDINATED WITH ALL PROCESS, EQUIPMENT,
  WATERPROOFING, ARCHITECTURAL, MECHANICAL, HVAC, FIRE PROTECTION, CIVIL,
  PLUMBING, ELECTRICAL WORK AND VENDOR'S DRAWINGS FOR EMBEDDED ITEMS NOT
  SPECIFIED ON THE DESIGN DRAWINGS. THE CONTRACTOR IS FULLY RESPONSIBLE
  FOR COORDINATING AND PLACING ALL EMBEDDED ITEMS SPECIFIED ON THE
  DRAWINGS OR REQUIRED BY VARIOUS TRADES.
- b. PRIOR TO PLACEMENT OF ANY CONCRETE, ALL DESIGN DRAWINGS MUST BE REVIEWED TO ENSURE THAT ALL EMBEDDED ITEM ARE PROPERLY PLACED AND ANCHORED. THE CONTRACTOR MUST VERIFY INSTALLATION AND LOCATIONS OF ALL EMBEDDED ITEMS INCLUDING, BUT NOT NECESSARILY LIMITED TO, INSERTS, ANCHOR
- EMBEDDED ITEMS INCLUDING, BUT NOT NECESSARILY LIMITED TO, INSERTS, ANCHOR BOLTS, ANCHOR RODS, DOWELS, BLOCKOUTS, SLEEVES, EMBEDDED PIPING AND CONDUIT PRIOR TO CONCRETE PLACEMENT.

  C. ALL EMBEDDED PLATES MUST BE FLUSH WITH FINISH SURFACE OF CONCRETE.

  d. WATERSTOPS MUST BE OF SIZE AND TYPE AS SPECIFIED ON THE DESIGN DRAWINGS AND IN THE PROJECT SPECIFICATIONS AND MUST BE CONNECTED TO PROVIDE A CONTINUOUS WATERTIGHT SEAL.
- 14. CONCRETE FLOOR AND ROOF SLOPES MUST BE AN INTEGRAL PART OF FRAMED SLABS. SEPARATE CONCRETE FILL OR TOPPING SLABS ARE NOT PERMITTED UNLESS NOTED OTHERWISE ON THE DESIGN DRAWINGS.
- 15. CONCRETE SURFACES SPECIFIED TO BE ROUGHENED MUST BE ROUGHENED TO 1/4" AMPLITUDE IN ACCORDANCE WITH ICRI CSP STANDARDS
- 16 CONCRETE SLABS AND BEAMS MUST BE PLACED MONOLITHICALLY LINESS NOTED
- 17. AIR-ENTRAIN ALL CONCRETE, EXCEPT FOR INTERIOR SLABS AND SLAB-ON-GRADE.
- 18. ALL CONCRETE MUST HAVE TYPE II PORTLAND CEMENT CONFORMING TO ASTM C150.
- 19. ALL CONCRETE MUST BE NOMINAL WEIGHT AND HAVE THE FOLLOWING MINIMUM
- STRENGTH UNLESS NOTED OTHERWISE:
  a. LEAN CONCRETE FOR FILL\_1000 PSI @ 28 DAYS
  b. SPREAD FOOTING AND FOUNDATION WALLS\_4500 PSI @ 28 DAYS
- c. SLAB-ON-GRADE4500 PSI @ 28 DAYS
- d. HOUSEKEEPING PADS 4500 PSI @ 28 DAYS e. LIQUID CONTAINMENT STRUCTURES\_5000 PSI @ 28 DAYS
- 20. ADHESIVE ANCHORING SYSTEM FOR DRILLED-IN REINFORCING BARS MAY BE PERMITTED SUBJECT TO THE APPROVAL, IN WRITING, BY THE ENGINEER. WHEN APPLICATION IS APPROVED. THE ANCHORING SYSTEM MUST BE DESIGNED BY A PROFESSIONAL APPROVED, THE AUCHORING STSTEM MUST BE DESIGNED BY A PROPESSIONAL STRUCTURAL ENGINEER REGISTERED IN THE STATE HAVING AUTHORITY OF THE PROJECT. THE ANCHORING SYSTEM MUST CONFORM TO THE REQUIREMENTS OF ICC-ES AC308 AND BE DESIGNED ACCORDING TO THE METHODS OUTLINES THEREIN AND BE CAPABLE DEVELOPING THE FULL YIELD STRENGTH OF THE BAR BASED ON THE RESULTS OF UNCONFINED PULL-OUT TESTING.

#### F. POST-INSTALLED ANCHORS

- 1. THE CONTRACTOR MUST BE RESPONSIBLE TO POSITION AND INSTALL ALL POST INSTALLED ANCHOR BOLTS TO THE LOCATIONS AND ELEVATIONS SPECIFIED ON THE DESIGN DRAWINGS, IN ACCORDANCE WITH THE REQUIREMENTS AND TOLERANCES OF THE PROJECT SPECIFICATION AND MANUFACTURER RECOMMENDATIONS. POST-INSTALLED ANCHORS MUST BE INSTALLED ONLY IN HARDENED, CURE CONCRETE THAT IS 28 DAYS OR OLDER.
- 2. DRILLED-IN ADHESIVE ANCHOR SYSTEM MUST BE HILTLHIT-RE 500V3. DIAMETER AND DRILLED-IN ADHESIVE ANCHOR SYSTEM MUST BE HILLTHIT-RE 500V3, DIAMETER AND ANCHOR MATERIAL AS SPECIFIED ON THE DESIGN DRAWINGS, COMPLETED WITH THREADED ROD, NUT AND WASHER AS MANUFACTURED BY HILTI, INC., OR EQUAL AS APPROVED, IN WRITING, BY THE ENGINEER. ANCHORS MUST BE INSTALLED IN PROPERI PREPARED AND CLEANED DRY HOLES, FREE OF STANDING WATER, MOISTURE, ETC. IN STRICT ACCORDANCE WITH MANUFACTURERS REQUIREMENTS.

#### G. CAST-IN-PLACE ANCHOR BOLTS & EMBEDMENTS

- 1. THE CONTRACTOR IS RESPONSIBLE TO POSITION AND INSTALL ALL ANCHOR BOLTS AND EMBEDMENTS TO THE LOCATIONS AND ELEVATIONS SPECIFIED ON THE DESIGN DRAWINGS AND IN ACCORDANCE WITH THE REQUIREMENTS AND TOLERANCES OF THE PROJECT SPECIFICATIONS. ALL ANCHOR BOLTS AND EMBEDMENTS MUST BE RIGIDLY. SECURED AND PROTECTED IN PLACE TO PREVENT MOVEMENT OR DAMAGE DURING CONCRETE PLACEMENT OPERATIONS WITH TEMPLATES. RIGID TEMPLATES MUST REMAIN IN PLACE A MINIMUM OF 24 HOURS AFTER CONCRETE PLACEMENT HAS CEASED.
- 2. THE CONTRACTOR IS RESPONSIBLE TO PROTECT ALL ANCHOR BOLTS AND EMBEDMENTS FROM DAMAGE OR RUST DURING SHIPMENT AND STORAGE
- 3. ANCHOR BOLTS MUST BE SHOP FABRICATED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS TO THE MATERIALS, DIAMETERS AND DIMENSIONS SPECIFIED ON THE DESIGN DRAWNINGS. ANCHOR BOLTS MUST BE COMPLETE WITH WASHERS AND HEAVY HEX NUTS. ALL ANCHOR BOLT ASSEMBLIES MUST BE TAGGED WITH MARK NUMBER, INCLUDING STEEL MATERIAL GRADE IDENTIFICATION.
- 4. STRUCTURAL STEEL EMBEDMENT PLATES, BARS, SHAPES, AND ASSEMBLIES MUST BE FABRICATED IN ACCORDANCE WITH THE PROJECT SPECIFICATION MATERIALS AS SPECIFIED ON THE DESIGN DRAWINGS AND MUST CONFORM TO THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC). ALL EMBEDMENT ASSEMBLIES MUST BE TAGGED WITH MARK NUMBER.
- 5 ANCHOR BOLT ASSEMBLIES AND STEEL EMBEDMENTS MUST BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 AND ASTM A153, AS APPLICABLE

#### STRUCTURAL ABBREVIATIONS

MANUFACTURE(R) (D) ABOVE FINISHED FLOOR MAS. MAX. MECH M.E.P. MASONRY ALTERNATE MAXIMUM ANCHOR BOLT MECHANICAL AND MECHANICAL/ELECTRICAL/PLUMBING M.E.P. MEZZ. MID. M.O. M.W.C.J. MTL. MIN. MISC. N.S. N.S.N.M. ANGLE MEZZANINE APPROX. APPROXIMATE(LY MIDDLE ARCH ARCHITECT(URAL MASONRY OPENING MASONRY WALL CONTROL JOINT MASONRY WALL CONTROL
METAL
MINIMUM
MISCELLANEOUS
NEAR SIDE
NO SHRINK NON METALLIC BASEMENT BASE PLATE BEAM BLK(G) BLOCK(ING) BD. BOT. B.C.X. воттом N.I.C. N.T.S. NOT IN CONTRACT NOT TO SCALE BOTTOM CHORD EXTENSION B.O. B.O.F. **BOTTOM OF** # or NO. O.C. NUMBER BOTTOM OF FOOTING ON CENTER OPNG. OPP. O.H. O.S.B. B.N. BLDG. BOUNDARY NAILING OPENING OPPOSITE BUILDING BRACKET OPPOSITE HAND BRKT. CAMB. CANT. C.I.P. @ or CL C.C.D. CLR. C.F. COL. CONC. CMU CONN. CAMBER ORIENTED STRAND BOARD O.S.B O.D. O.F. OH. PARA PART. PVMT PEN. CANTIL EVER OUTSIDE DIAMETER OUTSIDE FACE CAST-IN-PLACE OUTSIDE FACE OVERHEAD PARALLEL PARTITION PAVEMENT PENETRATION PENNY, NAIL CAST-IN-PLACE
CENTER LINE
CITY CONSTRUCTION DIRECTIVE
CLEAR(ANCE)
COLD FORMED COLUMN CONCRETE u PERIM PERP. CONCRETE MASONRY UNIT PERIMETER PERPENDICULAR CONNECT(ION) CONSTR CONSTRUCTION PIECE PLATE Pc. Por PL. CONSTRUCTION JOINT C.J. CONT. CONTINUE or CONTINUOUS PLUS OR MINUS PLYWOOD COORD COORDINATE CUBIC YARD DEEP POLYVINYL CHLORIDE PVC. LB(S). P.S.F. P.S.I. P.A.F. P.C. P.J.F. P.T. R or RAD ° or DEG. DEMO. DEGREE POLIND(S) POUND(S)
POUNDS PER SQUARE FOOT DEMOL(ISH)(ITION) DEMO.
DEPRESS.
DIAG.
O or DIA.
DBL.
DWL(S.)
DN.
DWG.
EA.
E.E. POUNDS PER SQUARE INCH POWER ACTUATED FASTENERS POWER ACTUATED FASTEN
PRECAST CONCRETE
PREFORMED JOINT FILLER
PRESSURE TREATED
RADIUS DOUBLE DOWEL(S) DRAWING REINFORCE(D) (ING EACH END REQ'MTS. REQUIREMENTS EACH FACE E.G. E.S. FOR EXAMPLE RET. REV. RETAINING EACH SIDE REVIS(E) (ION) R.D. REG. R.O. RBL. **FACH WAY** ROOF DRAIN ROOFING EDGE OF DECK FOD ROUGH OPENING FOS EDGE OF SLAF RUBBLE E.U.S. E.N. EL. EMBED. EQ. EQUIP. EQUIV. EDGE NAILING SAWCUT CONTROL JOINT SAWCUT CONTROL JI SECTION SHEAR CONNECTOR SHEARWALL SHORT WAY SIMILAR SLAB-ON-GRADE SLIP CRITICAL SOLITH MBEDMENT or EMBEDDED EMBEDMENT EQUIPMENT EQUIVALENT ESTIMATE EST. EXIST. or (E) **EXISTING** EXP **EXPANSION** SOUTH SPACE(S) S
SP(S).
SPEC.
SQ.
S.F.
S.J.
STD.
STL.
STD.
STLEFT.
STRUCT
SYM.
TEMP.
THKU
T.J.
TOL.
T.&G.
T.&G.
T.&G.
T.&G.
T.&J.
T&B.
T.&G.
T.&G.
T.&C.J.
T&B.
T.C.X. EXPANSION JOINT E.J. EXT. FAB. SPECIFICATION EXTERIOR FABRICATOR or FABRICATION SQUARE SQUARE FOOT or FEET F.O.C. F.O.M. FACE OF CONCRETE FACE OF MASONRY SQUARE INCH(ES) F.O.S. F.O.W FACE OF STUD STANDARD STAINLESS STEEL FACE OF WALL FAR SIDE FIBER REINFORCED PLASTIC STEEL STIFFENER FRP. FIN. F.F. FIN. GR. F.P. FLG. F.D. FT. FTG. F.S. STIPEPER STRUCTUR(E) (AL) SYMMETR(Y) (ICAL) TEMPORARY or TEMPERATURE THICK(EN) (ENED) (NESS) FINISHED GRADE
FIRE PROOF(ING) or PROTECTION
FLANGE
FLOOR DRAIN TONGUE AND GROOVE FNDN. F.W.C.J. FOUNDATION TOP AND BOTTOM FOUNDATION WALL CONTROL JOINT TOP CHORD EXTENSION GALVANIZE(D) GAUGE, GAGE T.O. T.O.C. TOP OF TOP OF CONCRETE GALV. GA. GEN. G.C. G.L. GR. GRD. H.S.A. HGT. H.P. HSS HK. HORIZ H.E.F. T.O.S. T.O.W. TOT. GENERA TOP OF STEEL TOP OF WALL GENERAL CONTRACT(OR GLUE LAMINATED TOTAL TREAD or TON TYPICAL UNLESS NOTED OTHERWISE HEADED STUD ANCHORS HEADED STOD ANCHORS
HEIGHT
HIGH POINT
HOLLOW STRUCTURAL SECTIONS
HOOK(ED) UNLESS NOTES OF HERWISE
VERIFY IN FIELD
VERTICAL
VERTICAL EACH FACE
WATERSTOPPED CONSTRUCTION JOINT HORIZONTAL HORIZONTAL EACH FACE HDG IN INFO. I.D. I.F. INT. HOT-DIP GALVANIZE WIDE WIDE FLANGE INCH(ES) INFORMATION W.W.F WELDED WIRE FABRIC W/O W.P. INSIDE DIAMETER INSIDE FACE WITH OUT INTERIOR WORKING POINT ISOLATION JOINT WOOD INVERT JOINT JOIST

JOIST
KIPS
KNOCKOUT
LAG BOLT
LAMINATED VENEER LUMBER
LINEAR FOOT
LINEAR INCH

LONG LEG HORIZONTAL

LONG SLOTTED HORIZONTAL

LONG SLOTTED VERTICAL

LONG LEG VERTICAL

LIGHTWEIGHT LIVE LOAD

LOW POINT

LONG

LG. LLH

LLV L.S.H.

L.S.V. L.W. L.P.

KLEINFELDER Bright People Right Solutions

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REVISIONS

EV	DECODIDATION	DSN	CHK	
ŒV	DESCRIPTION	DWN	APP	DATE

SCALE VERIFICATION

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

GENERAL NOTES SHEET 2 OF 2

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS PRELIMINARY DESIGN



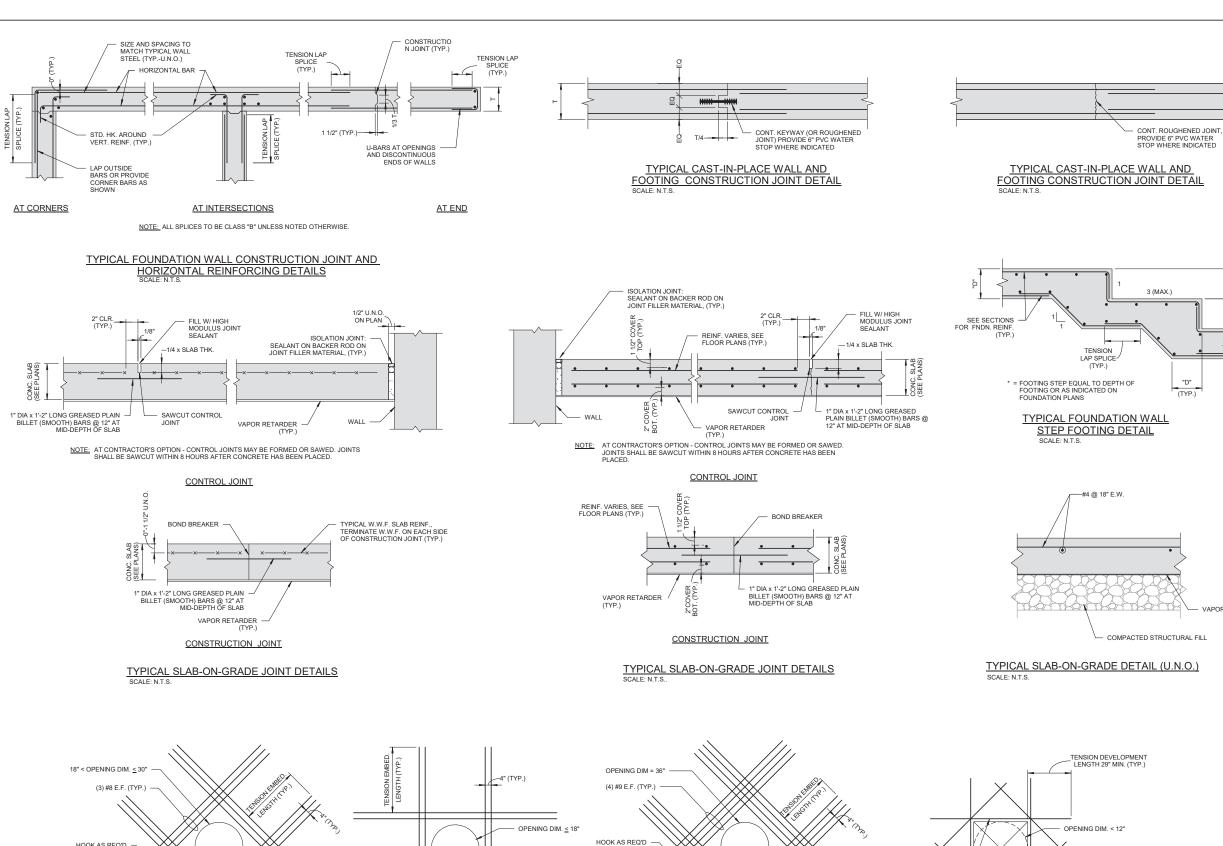
TOWN OF MILLIS DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 900 MAIN ST, MILLIS, MA 02054

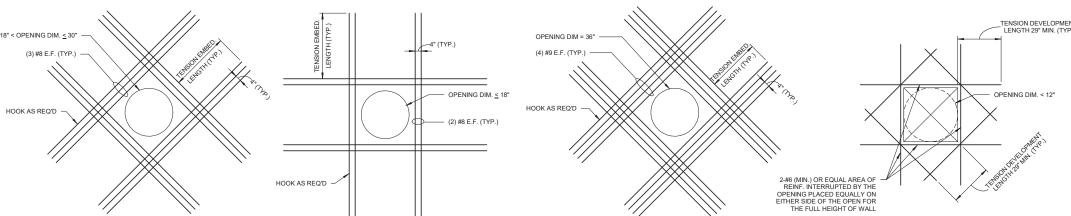
60% DESIGN

PROJECT NO. 20212063.003. ISSUE DATE SEPT. 2021 URRENT REVISION DRAWN BY JFC CHECKED BY MNK PPROVED BY

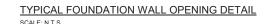
**REVIEW SET** NOT FOR CONSTRUCTION

S-002





NOTE: DESIGN ENGINEER MUST EVALUATE REINFORCING STEEL REQUIREMENTS FOR SPECIFIC PROJECT





VAPOR RETARDER



One Beacon Street, Suite 8100 Boston, MA 02108 Phone: 617-497-7800 www.kleinfelder.com

	REVISIONS			
DE1/	DECODIDEION	DSN	CHK	DATE
REV	DESCRIPTION	DWN	APP	DATE

SCALE VERIFICATION

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

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TYPICAL DETAIL SHEET 1 OF 2

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS PRELIMINARY DESIGN



TOWN OF MILLIS DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISIO 900 MAIN ST, MILLIS, MA 02054

60% DESIGN

ISSUE DATE DRAWN BY

S-011

TENSION LAP SPLICE LENGTHS - GRADE 60 UNCOATED BARS													
f'c = 3,000 psi or GREATER, NORMAL WEIGHT CONCRETE													
			f'c = 3	,000 psi			f'c = 4	000 psi			fc = 5	,000 psi	
BAR SIZE DESIGNATION	LAP CLASS	TOP	BARS	OTHER	R BARS	TOP	BARS	OTHER	BARS	TOP	BARS	OTHER	R BARS
		CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2
#3	Α	22	32	17	25	19	28	15	22	17	25	13	19
#3	В	28	42	22	32	24	36	19	28	22	33	17	25
#4	А	29	43	22	33	25	37	19	29	22	33	17	26
#4	В	37	56	29	43	32	48	25	37	29	43	22	33
45	Α	36	54	28	41	31	47	24	36	28	42	22	32
#5	В	47	70	36	54	40	60	31	47	36	54	28	42
#6	А	43	64	33	50	37	56	29	43	33	50	26	38
#6	В	56	84	43	64	48	72	37	56	43	65	33	50
#7	А	63	94	48	72	54	81	42	63	49	73	37	56
#/	В	81	122	63	94	70	106	54	81	63	94	49	73
40	А	72	107	55	82	62	93	48	72	55	83	43	64
#8	В	93	139	72	107	80	121	62	93	72	108	55	83
#9	А	81	121	62	93	70	105	54	81	63	94	48	72
#9	В	105	157	81	121	91	136	70	105	81	122	63	94
#40	А	91	136	70	105	79	118	61	91	70	105	54	81
#10	В	118	177	91	136	102	153	79	118	91	137	70	105
#4.4	Α	101	151	78	116	87	131	67	101	78	117	60	90
#11	В	131	196	101	151	113	170	87	131	101	152	78	117
#14	N/A	121	181	93	139	105	157	81	121	94	140	72	108
#18	N/A	161	241	124	186	139	209	107	161	125	187	96	144

#### NOTES:

- 1. TABULATED VALUES ARE BASED ON GRADE 60 REINFORCING BARS AND NORMAL WEIGHT CONCRETE.
- 2. TENSION DEVELOPMENT LENGTHS AND TENSION LAP SPLICE LENGTHS ARE BASED ON ACI 318-14, SECTION 12.2.2 AND 12.15, RESPECTIVELY. TABULATED VALUES FOR BEAMS OR COLUMNS ARE BASED ON TRANSVERSE REINFORCEMENT AND CONCRETE COVER MEETING MINIMUM CODE REQUIREMENTS. LENGTHS ARE IN INCHES.
- 3. CASES 1 AND 2, WHICH DEPEND ON THE TYPE OF STRUCTURAL ELEMENT, CONCRETE COVER, AND THE CENTER-TO-CENTER SPACING OF THE BARS, ARE DEFINED AS:

	BEAMS or	CASE 1	COVER AT LEAST 1db AND CTRCTR. SPACING AT LEAST 2db
	COLUMNS	CASE 2	COVER LESS THAN 1db AND CTRCTR. SPACING LESS THAN 2db
	ALL OTHERS	CASE 1	COVER AT LEAST 1db AND CTRCTR. SPACING AT LEAST 3db
		CASE 2	COVER LESS THAN 1db AND CTRCTR. SPACING LESS THAN 3db

- 4. LAP CLASS A VALUES ARE THE REQUIRED TENSION DEVELOPMENT LENGTHS, L<sub>d</sub>; LAP SPLICE LENGTHS ARE MULTIPLES OF TENSION DEVELOPMENT LENGTHS; CLASS A 1.0L<sub>d</sub> AND CLASS B = 1.3L<sub>d</sub> (ACE 318-02, SECTION 12.15.1).
- 5. LAP SPLICES OF #14 or #18 BARS ARE NOT PERMITTED. THE TABULATED VALUES FOR THOSE BAR SIZES ARE THE TENSION DEVELOPMENT
- 6. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12 INCHES OF CONCRETE CAST BELOW THE BARS.
- 7. FOR LIGHTWEIGHT AGGREGATE CONCRETE, MULTIPLY THE TABULATED VALUES BY 1.3; or WHEN fet IS SPECIFIED, THE FACTOR IS 6.7 Vol ft et > 1.0.

EXTERIOR

COMPACTED STRUCTURAL

2'-0" MIN.

EXCAVATION OF EXIST. FILL BOTH SIDES

FILL

BUILDING

SLAB ON GRADE

RETARDER

- FOOTINGS SHALL BEAR ON NATURAL SOIL DEPOSIT OR ON COMPACTED STRUCTURAL FILL. WHEN THE EXISTING FILL DEPOSIT IS BELOW THE FOOTING BEARING ELEVATION, OVEREXCAVATE EXISTING FILL MATERIAL TO THE NATURAL SOIL DEPOSIT. BACKFILL WITH COMPACTED STRUCTURAL FILL TO BOTTOM OF FOOTING ELEVATIONS. WHEN BEARING ON NATURAL SOIL DEPOSIT, PROOF ROLL NATURAL SOIL DEPOSIT.

FOUNDATION WALL

RIGID INSULATION SEE ARCH. DWGS.

FOOTING

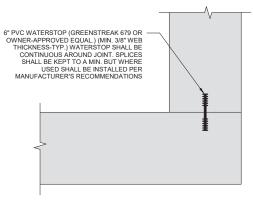
PROOF ROLLED SUBGRADE

REFER TO EARTHWORK SPECIFICATION FOR ADDITIONAL REQUIREMENTS.

SCALE: N.T.S.

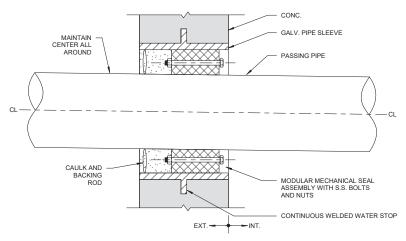
8. FOR EPOXY-COATED BARS, MULTIPLY THE TABULATED VALUES BY ONE OF THE FOLLOWING FACTORS:

CONCRETE COVER AND SPACING	TOP BARS	OTHER BARS
COVER < 3db or CTRCTR. SPACING > 7db	1.7 / 1.3 - 1.31	1.50
COVER ≤ 3d <sub>b</sub> or CTRCTR. SPACING ≤ 7d <sub>b</sub>	1.20	1.20



## TYPICAL PVC WATERSTOP DETAIL

# (AT CONSTRUCTION JOINTS)

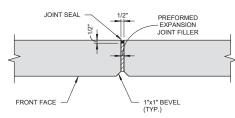


TYPICAL WALL PIPE PENETRATION SEAL DETAIL SCALE: N.T.S.

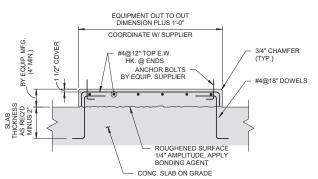
TYPICAL SUBGRADE PREPARATION DETAIL

SCALE: N.T.S.

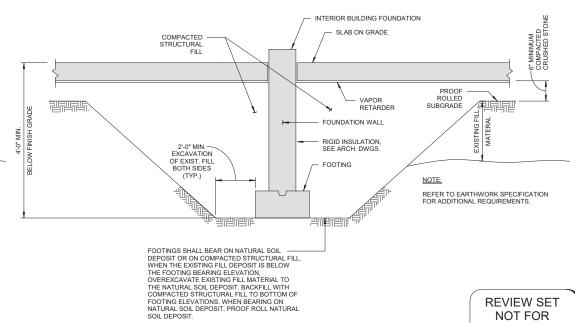
- JOINT SEAL TO EXTEND FROM TOP OF FOOTING TO TOP OF WALL AND HORIZONTALLY ALONG THIS JOINT TO FRONT FACE OF WALL.
   NO REINFORCEMENT SHALL PASS THROUGH EXPANSION OR CONTRACTION JOINTS. REINFORCEMENT SHALL PASS THROUGH CONSTRUCTION JOINTS.



# TYPICAL CAST-IN-PLACE RETAINING WALL & FOOTING EXPANSION JOINT DETAIL



NOTE: SEE MECH., ELEC., PLUMBING AND ARCH. DWGS. FOR LOCATIONS. TYPICAL INTERIOR CONCRETE PAD DETAIL SCALE: N.T.S.





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SCALE VERIFICATION IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

TYPICAL DETAIL SHEET 2 OF 2

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS PRELIMINARY DESIGN



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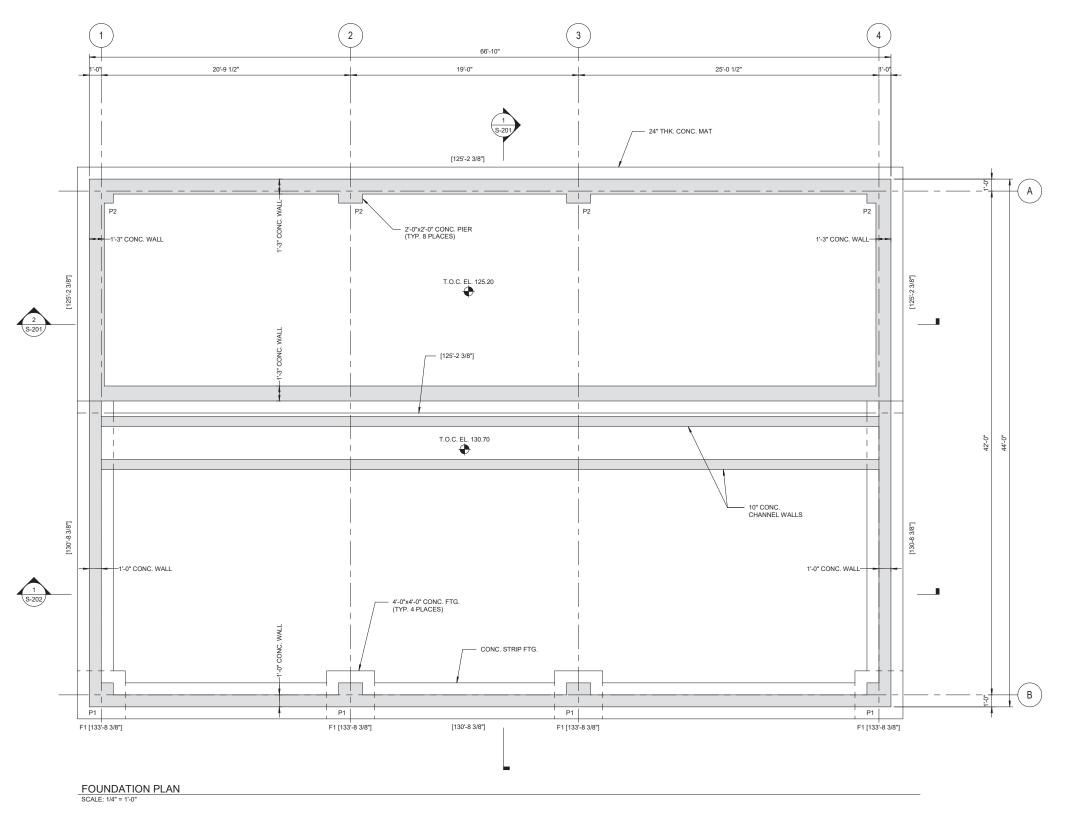
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CONSTRUCTION

S-012





#### NOTES:

- 1. REFER TO DRAWING S-001 & S-002 FOR GENERAL NOTES AND ABBREVIATIONS.
- 2. REFER TO DRAWING S-012 & S-013 FOR TYPICAL DETAILS.
- 3. [#-#"] DENOTES T.O.C. SLAB/STRIP FOOTING ELEVATION.
- 4. F# [#-#"] DENOTES FOOTING TYPE & T.O.C. ELEVATION.
- 5. P# DENOTES PIER TYPE.

#### REFERENCE SPECIFICATIONS:

03300 - CAST-IN-PLACE CONCRETE



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FOUNDATION PLAN

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS PRELIMINARY DESIGN



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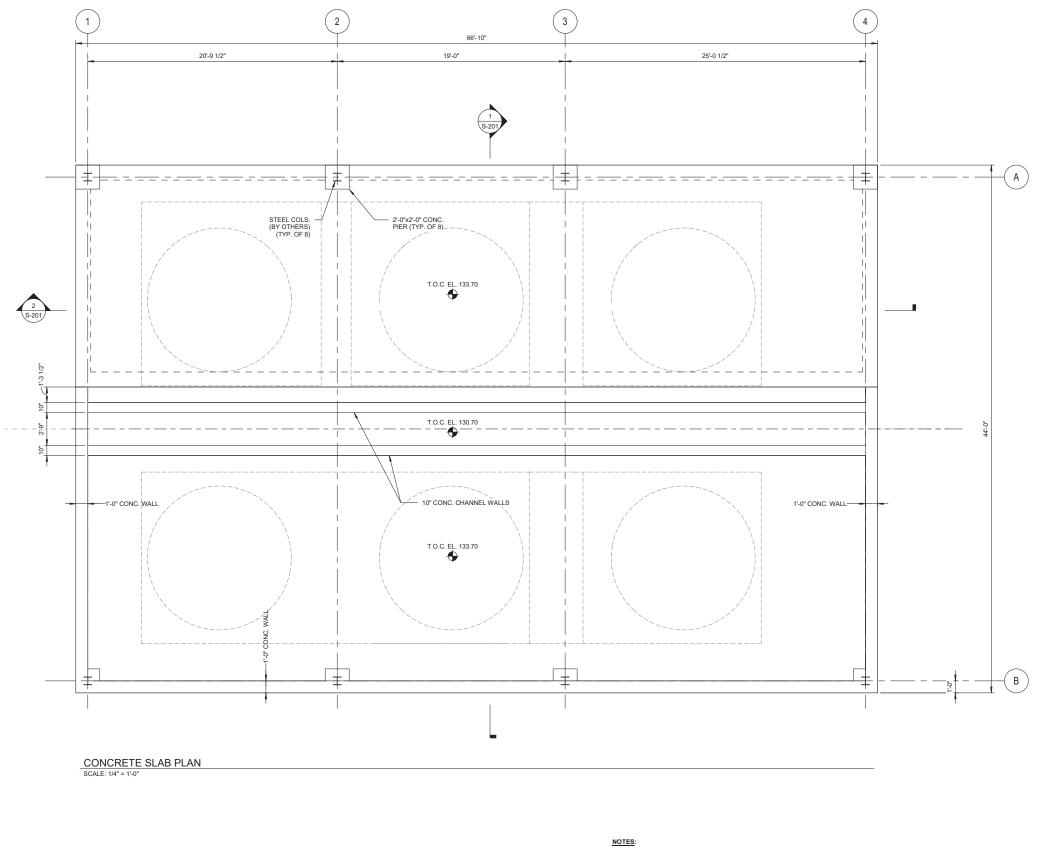
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CONSTRUCTION

S-101

SHEET 25

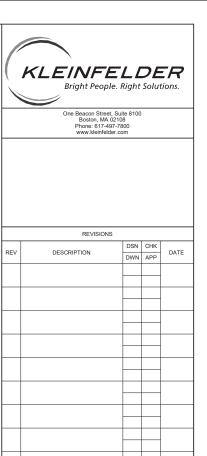




- 1. REFER TO DRAWING S-001 & S-002 FOR GENERAL NOTES AND ABBREVIATIONS.
- 2. REFER TO DRAWING S-012 & S-013 FOR TYPICAL DETAILS.

#### REFERENCE SPECIFICATIONS:

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SCALE VERIFICATION

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CONCRETE SLAB PLAN

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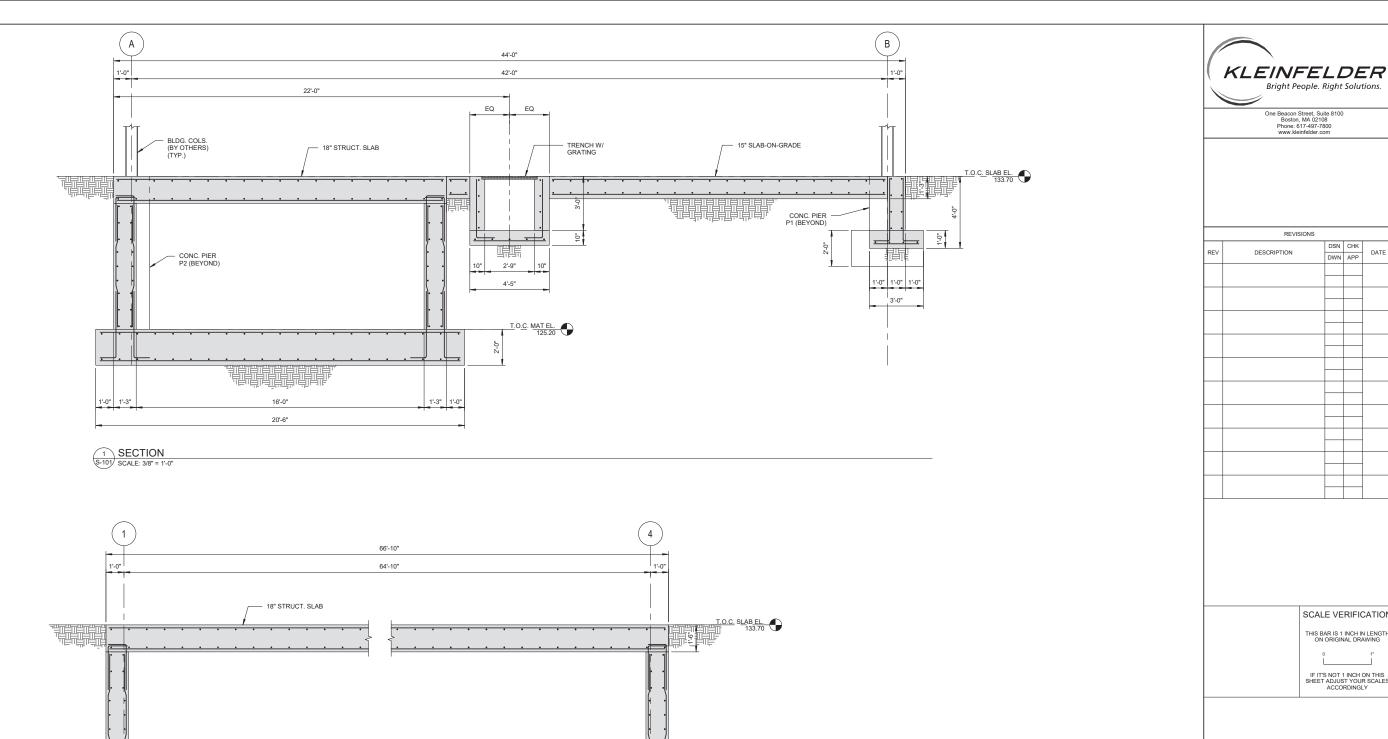
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S-102

ET 26

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64'-4" 68'-10"

2 SECTION S-101 SCALE: 3/8" = 1'-0"

T.O.C. MAT EL. 125.20

NOTES:

REFERENCE SPECIFICATIONS:

03300 - CAST-IN-PLACE CONCRETE

1. REFER TO DRAWING S-001 & S-002 FOR GENERAL NOTES AND ABBREVIATIONS.

2. REFER TO DRAWING S-012 & S-013 FOR TYPICAL DETAILS.

ORIGINAL DRAWING SIZE IS 22 x 34 SECTIONS SHEET 1 OF 2 TOWN OF MILLIS, MASSACHUSETTS

SCALE VERIFICATION

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27 of 46

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1. REFER TO DRAWING S-001 & S-002 FOR GENERAL NOTES AND ABBREVIATIONS.

2. REFER TO DRAWING S-012 & S-013 FOR TYPICAL DETAILS.

NOTES:

REFERENCE SPECIFICATIONS:

03300 - CAST-IN-PLACE CONCRETE



T.O.C. SLAB EL. 133.70

1 SECTION S-101 SCALE: 3/8" = 1'-0"

3'-0"

64'-10"

- 15" SLAB-ON-GRADE

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SECTIONS SHEET 2 OF 2

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS PRELIMINARY DESIGN



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CUH\

P11-LP (21

EQUIPMENT CIRCUIT NUMBER DESIGNATION TO PANEL

LP1-LP CIRCUIT #21,

#### FIRE ALARM / SECURITY SYSTEM SYMBOLS F MANUAL FIRE ALARM STATION ₽Þ FIRE ALARM AUDIO/VISUAL DEVICE F⊲∨ FIRE ALARM VISUAL ONLY DEVICE Œ FIRE ALARM BEACON (S) SMOKE DETECTOR 9 DUCT SMOKE DETECTOR RTS REMOTE TEST STATION AND ALARM FOR DUCT SMOKE DETECTOR HEAT DETECTOR, COMBINATION RATE-OF-RISE $\oplus$ 0 CARBON MONOXIDE DETECTOR М INPUT MONITORING MODULE С RELAY CONTROL MODULE FACP FIRE ALARM CONTROL PANEL FAA FIRE ALARM ANNUNCIATOR PANEL

CELLUAR DIGITAL ALARM COMMUNICATOR TRANSMITTER

DACT

仓

K

DS

ΚP

Ŋ

SACP

1TV2D

CCTV

DVRS

POES

MASTER BOX

KEY DEPOSITORY - KNOX BOX

MAGNETIC DOOR SWITCH

l	INTOTAL TO BOOK STITLET
	KEY PAD
	SECURITY ALARM CONTROL PANEL
	SECURITY ALARM CONTROL PANEL
	TELE/DATA & CCTV SYMBOLS
	WALL MOUNTED DATA OUTLET, 2D INDICATES (2) CAT6 TERMINAL DATA CONNECTORS, 1T INDICATES (1) CAT6 TERMINAL TELEPHONE CONNECTOR
	CLOSED CIRCUIT TELEVISION CAMERA - PROVIDED BY DIV. 13
	DIGITAL VIDEO RECORDING SERVER - PROVIDED BY DIV. 13
	POWER OVER ETHERNET SWITCH — PROVIDED BY DIV. 13



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ELECTRICAL LEGEND AND GENERAL NOTES

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



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E-1

ALL CONDUIT AND EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE AND APPLICABLE LOCAL CODES.

BONDING JUMPERS, CONDUIT CLAMPS AND POINTS OF ATTACHMENT ARE NOT SHOWN ON DRAWINGS. SIZE BONDING JUMPERS IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. THE POINTS OF ATTACHMENT OF THE GROUND CLAMPS SHALL BE ACCESSIBLE LOCATIONS.

EQUIPMENT & CONDUIT INSTALLATIONS ARE SHOWN DIAGRAMMATICALLY ONLY AND SHALL BE INSTALLED IN A MANNER TO PREVENT CONFLICTS WITH EQUIPMENT AND STRUCTURAL CONDITIONS. EXPOSED CONDUITS SHALL BE INSTALLED PARALLEL TO BEAMS AND WALLS.

CONDUITS SHALL BE TERMINATED SO AS TO PERMIT NEAT CONNECTIONS TO MOTORS AND OTHER EQUIPMENT.

6. NO CONDUIT SMALLER THAN 3/4" PIPE SIZE NOR WIRE SMALLER THAN NO. 12 A.W.G. SHALL BE USED UNLESS OTHERWISE NOTED.

RECEPTACLES AND SWITCHES SHALL BE MOUNTED 45" ABOVE FINISHED FLOOR.

THE WIRING AND BLOCK DIAGRAMS, QUANTITY AND SIZE OF WIRES AND CONDUIT REPRESENT A SUGGESTED ARRANGEMENT BASED UPON SELECTED STANDARD COMPONENTS OF ELECTRICAL AND PROCESS EQUIPMENT. MODIFICATIONS ACCEPTABLE TO THE ENGINEER MAY BE MADE BY THE CONTRACTOR TO ACCOMMODATE EQUIPMENT ACTUALLY PURCHASED. THE BASIC SEQUENCE AND METHOD OF CONTROL MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS AND/OR

## DEMOLITION NOTES

UNLESS OTHERWISE NOTED, ALL EXISTING ELECTRICAL SYSTEMS (POWER, LIGHTING, LOW VOLTAGE, CONTROLS, ETC) AND ASSOCIATED EQUIPMENT INDICATED WITH HATCH MARKS IS TO BE DEMOLISHED. DISCONNECT AND DE-ENERGIZE THE EQUIPMENT TO BE DEMOLISHED OR SALVAGED PER SECTION 02050. ALL CONTROL DEVICES, CONDUIT, CABLING, BOXES, SUPPORTS, ETC, ASSOCIATED WITH THE DEMOLISHED EQUIPMENT SHALL BE REMOVED. THE CONDUIT AND CABLING SHALL BE REMOVED BACK TO SOURCE.

2. DISCONNECT AND REMOVE THE ELECTRICAL SERVICE FROM METER. COORDINATE WITH READING MUNICIPAL LIGHT DEPARTMENT (RMLD) FOR DISCONNECTION OF SERVICE AT TRANSFORMERS.

 NO DEVICE OR EQUIPMENT INDICATED FOR DEMOLITION WILL BE REUSED OR SALVAGED UNLESS SPECIFICALLY NOTED AS SUCH. ALL EQUIPMENT REMOVED SHALL BE REMOVED FROM SITE AND PROPERLY DISPOSED OF, PRIOR TO REMOVAL OF EQUIPMENT COORDINATE WITH OWNER FOR ANY EQUIPMENT THE

EXISTING EQUIPMENT INDICATED ON THE DEMOLITION PLANS ARE BASED ON SITE OBSERVATIONS AND IT IS NOT THE INTENTION OF THESE DRAWINGS TO SHOW ALL EQUIPMENT AND MATERIALS TO BE DISCONNECTED AND/OR

ALL UNDERGROUND CONDUIT SHALL BE CUT BELOW GRADE, CAPPED AND BACKFILLED WITH DIRT TO MATCH GRADE. ALL CONDUIT STUBBING UP FROM CONCRETE SLAB SHALL BE CUT AND CAPPED AND SLAB LEVEL. ALL WIRING SHALL BE REMOVED COMPLETELY.

	· · · · · · · · · · · · · · · · · · ·		
(2)1°C, 3#8, #10GND	2, 1-INCH CONDUITS EACH CONDUIT CONTAINING 3-#8 AWG WIRES AND 1-#10 GROUND CONDUCTOR	RGS	RIGID GALVANIZED STEEL
3/4" CE	EMPTY CONDUIT. NUMERAL DENOTES SIZE	RVNR	REDUCED VOLTAGE NON-REVERSING
AFF	ABOVE FINISHED FLOOR	SPD	SURGE SUPPRESSOR DEVICE
AFG	ABOVE FINISHED GRADE	SOV	SOLENOID VALVE
AR	ALARM RELAY	s/s	SOFT STARTER
ATS	AUTOMATIC TRANSFER SWITCH	TB	TERMINAL BOX
CR	CONTROL RELAY	TD	MOTOR TEMPERATURE DETECTOR
CP	CONTROL PANEL	TR	TIMING RELAY
DRG. DWG.	DRAWING	TS	TEMPERATURE SWITCH
		TSP	TWISTED SHEILDED PAIR
EAN	EXCEPT AS NOTED	TSTW	TWO SPEED TWO WINDING
EC	ELECTRICAL CONTRACTOR	TYP	TYPICAL
ETM	ELAPSED TIME METER	UG	UNDERGROUND
FE	FLOW ELEMENT	UNO	UNLESS OTHERWISE NOTED
FIT	FLOW INDICATOR TRANSMITTER	VFD	VARIABLE FREQUENCY DRIVE
FII	FLOW INDICATOR TRANSMITTER	WP	WATER PROOF
FS	FLOW SWITCH	WHM	WATT HOUR UTILITY METER
FT	FLOW TRANSMITTER	XFMR	TRANSFORMER
FVNR	FULL VOLTAGE NON-REVERSING		

GROUNDING CONDUCTOR (EQUIPMENT)

HAND-OFF-AUTOMATIC

HANDHOLE

JUNCTION BOX JOG PUSHBUTTON

LEVEL ELEMENT

LEVEL SWITCH

LEVEL TRANSMITTER

MANUFACTURER

NOT TO SCALE

OVERHEAD

LEVEL INDICATOR TRANSMITTER

MOTOR CONTROLLER (STARTER) MOTOR CONTROL CENTER

MOTION OR MOISTURE SENSOR

MOTOR OVERLOAD HEATER

OPERATOR STATION

ORIGINAL EQUIOPMENT MANUFACTURE SUPPLIED

PUSHBUTTON CONTROL STATION MOMENTARY CONTACT TYPE, STOP START

PUSHBUTTON CONTROL STATION MAINTAINED EMERGENCY STOP TYPE, TWIST TO RELEASE PUSHBUTTON CONTROL STATION MOMENTARY TYPE WITH LOCK-OUT DEVICE, STOP-START

PUSHBUTTON CONTROL STATION MAINTAINED CONTACT TYPE, STOP START

PRESSURE INDICATOR TRANSMITTER PUSHBUTTON CONTROL STATION MOMENTARY TYPE WITH LOCK-OUT DEVICE, STOP

GND. GRD

HOA

J OR JB

JPB

LE LIT

LS

LT

MC

мсс

MFR

MS

NTS

ОЕМ

ОН

OL

OS

PB

PBE

PBL PRM

PIT

**ABBREVIATIONS** 

KLEINFELDER Bright People. Right Solutions. DESCRIPTION DATE SCALE VERIFICATION THIS BAR IS 1 INCH IN LENGT ON ORIGINAL DRAWING IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

ELECTRICAL GENERAL NOTES

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES

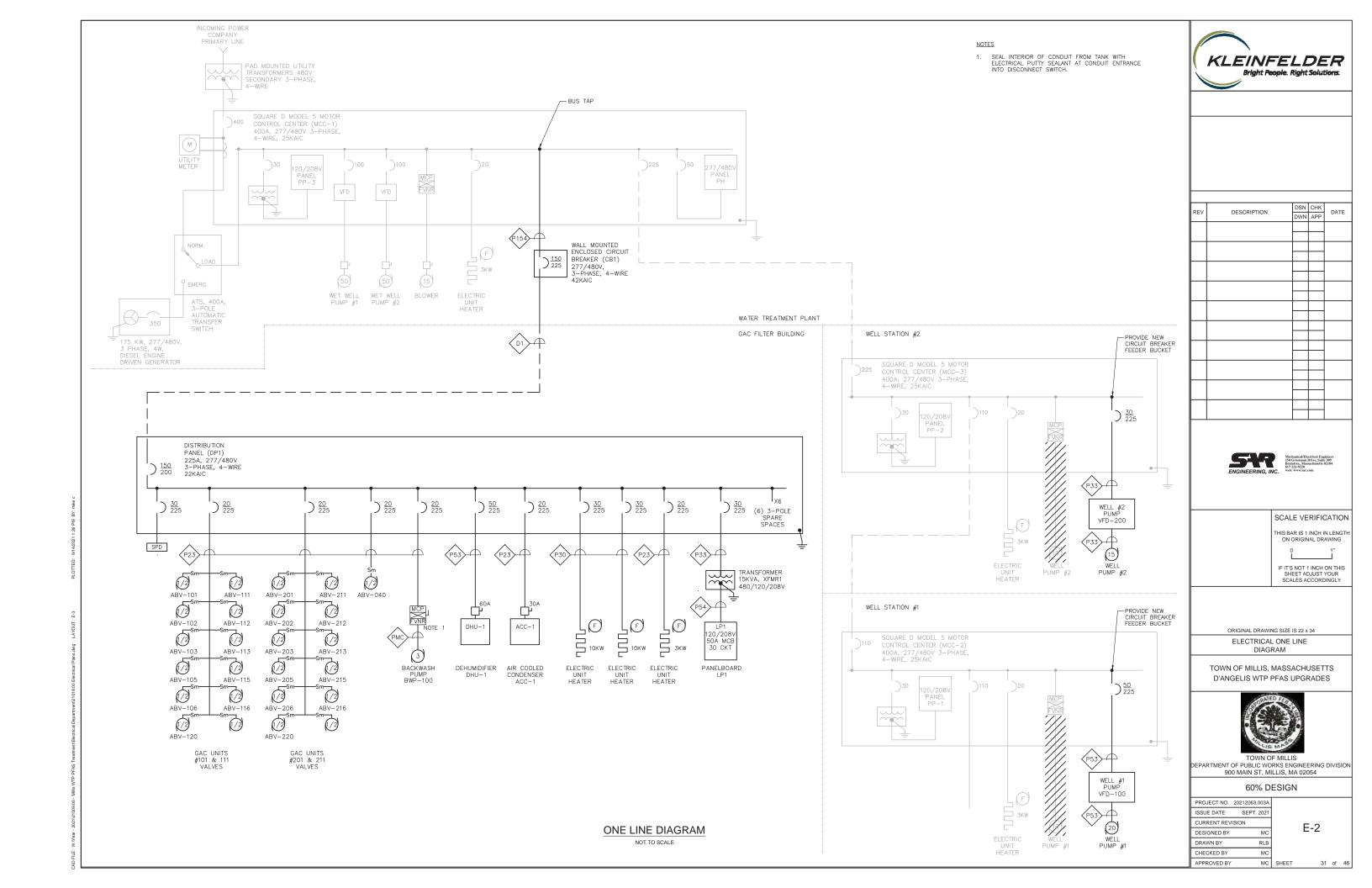


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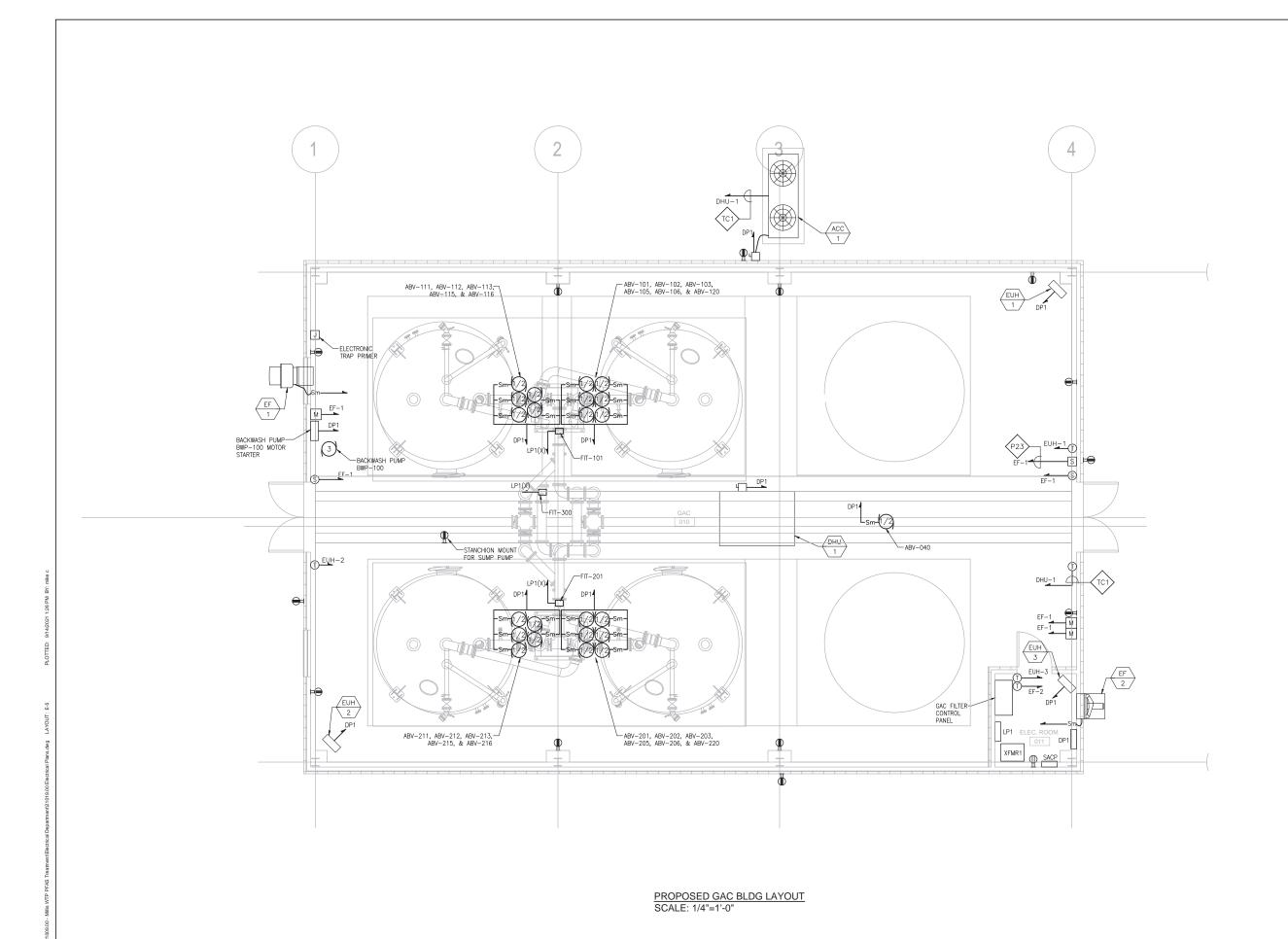
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ELECTRICAL FLOOR PLAN

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



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E-5

PROPOSED GAC BLDG LAYOUT SCALE: 1/4"=1'-0"



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ELECTRICAL LIGHTING FLOOR PLAN

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E-6

PROPOSED GAC BLDG LAYOUT SCALE: 1/4"=1'-0"



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		DESCRIPTION	DWN	APP	DATE



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ELECTRICAL LOW VOLTAGE FLOOR PLAN

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ELECTRICAL WTP FLOOR PLAN

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES

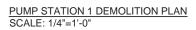


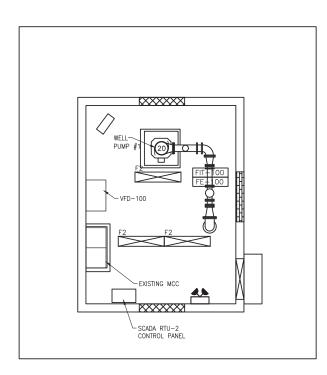
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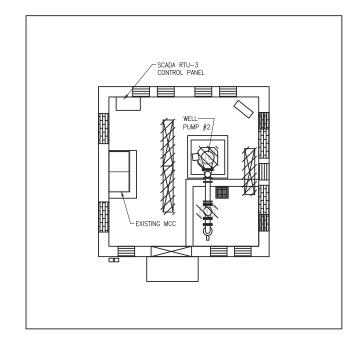
36 of 46

PROPOSED WTP BLDG LAYOUT SCALE: 1/4"=1'-0"

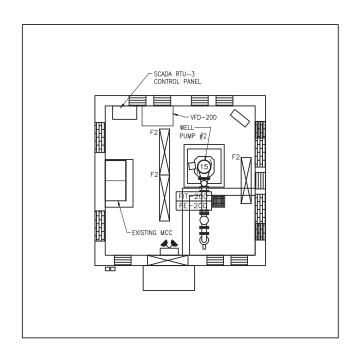




PUMP STATION 1 NEW WORK PLAN SCALE: 1/4"=1'-0"



PUMP STATION 2 DEMOLITION PLAN SCALE: 1/4"=1'-0"



PUMP STATION 2 NEW WORK PLAN SCALE: 1/4"=1'-0"



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SCALE VERIFICATION

ELECTRICAL PUMP STATION FLOOR PLANS

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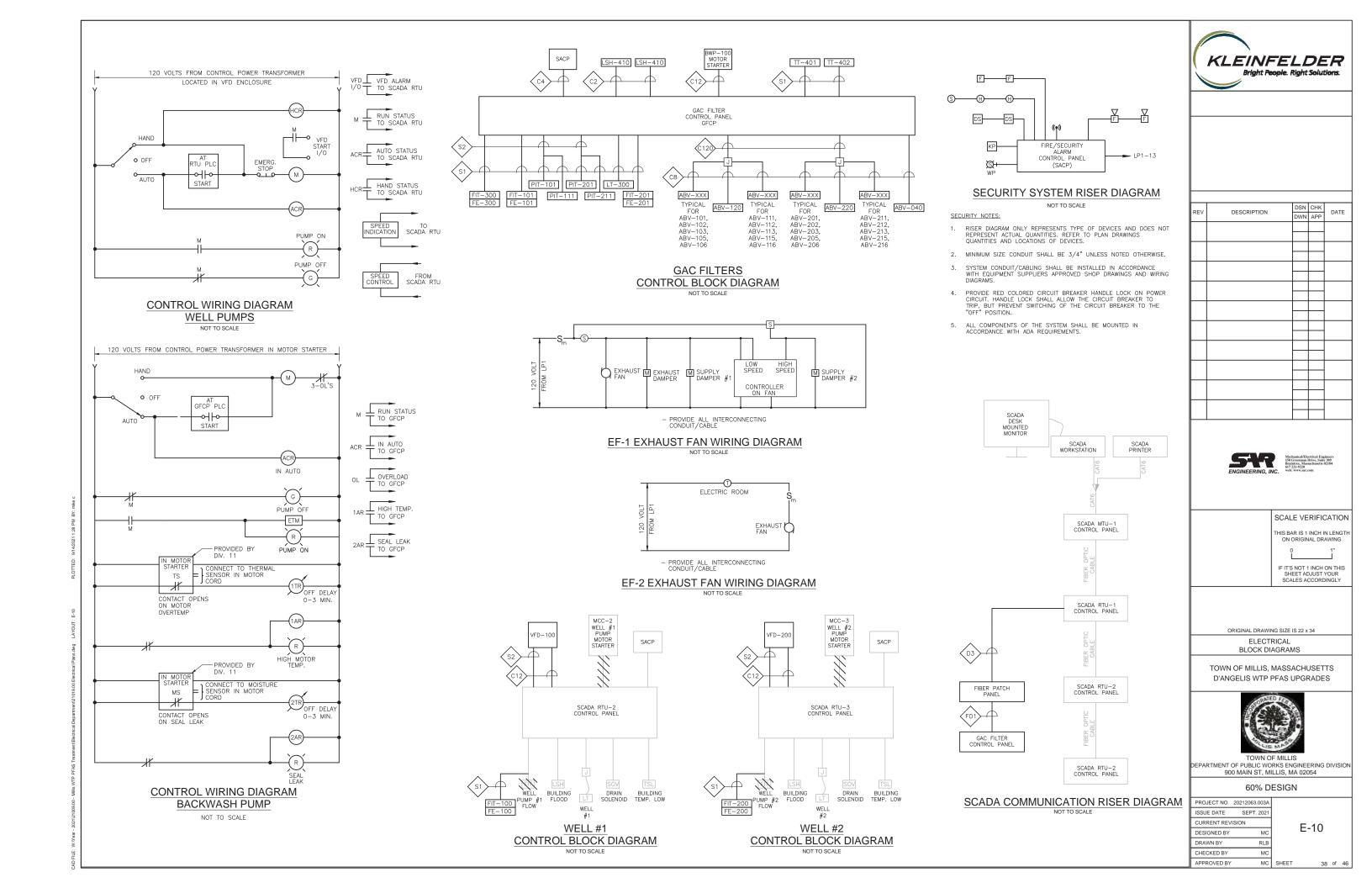


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DESIGNED BY	MC	
DRAWN BY	RLB	
CHECKED BY	MC	
APPROVED BY	MC	SH

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BY: mike c
12:35 PM
9/14/2021
PLOTTED:

	PANELBOARD SCHEDULE														
NC	NO. LP1 LOCATION: 011 ELECTRIC ROOM														
_	208/120 V, 3 PH, 4 W, - A MAIN, 22,000 AIC AT - V FULL GROUND BUS						100%	_ S	SOLID I	NEUTRAL;				MCB MLO SURFACE MOUNTING	
DESCRIPTION OF LOAD		LOA	AD (K	VA)	BREAKER	₹	T		1	BREAKER		LOAD (KVA)			Ę
CIRCUIT	DESCRIPTION OF LOAD	Αø	Вø	Сø	TRIP	POLE	111	ıĖ	POLE	TRIP	Αø	Вø	Cø	DESCRIPTION OF LOAD	CIRCUIT
1	-	-			-	1	++	╁	1	-	-			-	2
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9			-			1	++	t١	1			-		-	10
11				-		1	!++	ŧĻ	1	_			-	-	12
13		-				1	<del>     </del>	ϯͺ	1		-			=	14
15			_			1	++	tļ.	1			-		-	16
17				-		1	++	ŧĻ	1	_			-	=	18
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23				-	_	1	++	ŧĻ	1				-	-	24
25		-			_	1	<del>     </del>	tL	1		_			-	26
27			_			1	++	ϯͺ	1	_		-		=	28
29				-	_	1	<del>                                      </del>	<u> </u>	1				-	-	30
SUE	F-TOTAL CONNECTED	-	-	-							_	-	-	SUB-TOTAL CONNECTED	
*	PROVIDE GFCI BREAKER					SUB-TO									
						SUB-TO									
						SUB-TO									
					T	TOTAL (	CONNE	CTE	.D	KVA	=	_			

		L	_IGHTI	NG FIXT	URE S	CHED	ULE		
TYPE	DESCRIPTION	MANUFACTURER & CATALOG SERIES	TYPE	TYPE LUMENS V		WATTS	MOU! TYPE	NTING HEIGHT	REMARKS
F1	48" LED ENCLOSED AND GASKETED INDUSTRIAL LIGHTING FIXTURE.	LITHONIA FEM-L48-6000LM-IMAFL- MVOLT-35K-80CRI	LED 3500K	6000lm	120	45	PENDANT	12'-0"ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED	
F2	48" LED ENCLOSED AND GASKETED INDUSTRIAL LIGHTING FIXTURE.	LITHONIA FEM-L48-4000LM-IMAFL- MVOLT-35K-80CRI	LED 3500K	4000lm	120	31	SURFACE		
W1	EXTERIOR BUILDING MOUNTED LED WALL PACK LIGHT FIXTURE	LITHONIA TWP-LED-20C-700-50K- T3M-120-PE-DDXB	LED 5000K	4200lm	120	45	WALL		INTEGRAL PHOTOCELLL CONTROLLED
	SELF CONTAINED EMERGENCY LIGHTING BATTERY UNIT NEMA 4 WITH TWO LIGHTING HEADS	REFER TO SPECIFICATIONS			120	8W	WALL		INSTALL 3/4"C, 2#12, 1#12GND TO REMOTE HEADS
	SEALED-BEAM WEATHERPROOF REMOTE LIGHTING FIXTURE WITH TWO LIGHTING HEADS	REFER TO SPECIFICATIONS			120	8W	WALL		
⊗⊣	EMERGENCY EXIT SIGN LED TYPE WITH BATTERY BACK-UP NEMA 4X	REFER TO SPECIFICATIONS			120		WALL		

#### LIGHTING FIXTURE SCHEDULES NOTES:

 THE CATALOG NUMBERS LISTED ARE GIVEN AS A GUIDE TO THE DESIGN AND QUALITY OF FIXTURE DESIRED. EQUIVALENT DESIGNS, MATERIALS, DIMENSIONS, COEFFICIENT OF UTILIZATIONS AND EQUAL QUALITY FIXTURES OF OTHER MANUFACTURERS WILL BE ACCEPTABLE.

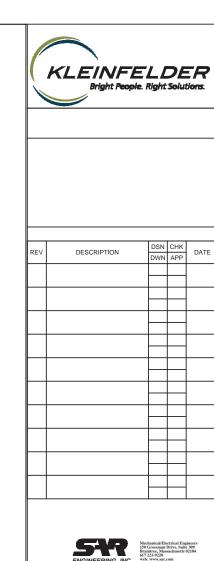
	POWER CABI	E/CONDUIT SC	HEDULE
SYMBOL	CONDUIT SIZE	CONDUCTORS*	GND*
P22	3/4"	(2)#12	(1)#12
P23	3/4"	(3)#12	(1)#12
P26	3/4"	(6)#12	(1)#12
P32	3/4"	(2)#10	(1)#10
P33	3/4"	(3)#10	(1)#10
P53	3/4"	(3)#8	(1)#10
P54	3/4"	(4)#8	(1)#10
P63	1"	(3)#6	(1)#8
P64	1"	(4)#6	(1)#8
P83	1 1/4"	(3)#4	(1)#8
P84	1 1/4"	(4)#4	(1)#8
P103	1 1/2"	(3)#3	(1)#6
P104	1 1/2"	(4)#3	(1)#6
P113	1 1/2"	(3)#2	(1)#6
P114	1 1/2"	(4)#2	(1)#6
P133	2"	(3)#1	(1)#6
P134	2"	(4)#1	(1)#6
P153	2"	(3)#1/0	(1)#6
P154	2 1/2"	(4)#1/0	(1)#6
PMC	1 1/2" THRU TANK SLAB	MANUFACTURE SUPPLIE	D PUMP CABLE

TELE/DATA CABLE/CONDUIT SCHEDULE						
SYMBOL	CONDUIT SIZE	CABLES				
TD1	1"	1-CAT6				
F01	1"	6-STRAND FIBER OPTIC CABLE				

SIGNAL CABLE/CONDUIT SCHEDULE							
SYMBOL	CONDUIT SIZE	CONDUCTORS					
S	1"	VENDER PROVIDED					
S1	3/4"	1-2/C#16 TSP					
S13	3/4"	1-3/C#16 TSP					
S2	3/4"	2-2/C#16 TSP					
S23	3/4"	2-3/C#16 TSP					
S3	1"	3-2/C#16 TSP					
S33	1"	3-3/C#16 TSP					
S4	1"	4-2/C#16 TSP					
S5	1"	5-2/C#16 TSP					
S6	1 1/2"	6-2/C#16 TSP					
S7	1 1/2"	7-2/C#16 TSP					
S8	1 1/2"	8-2/C#16 TSP					
S9	1 1/2"	9-2/C#16 TSP					
S10	2"	10-2/C#16 TSP					
TC1	3/4"	8/C#18					

	CONTROL CABLE/CONDUIT SO	CHEDULE
SYMBOL	CONDUIT SIZE	CONDUCTORS
C2	3/4"	2#14
C4	3/4"	4#14
C5	3/4"	5#14
C6	3/4"	6#14
C7	3/4"	7#14
C8	3/4"	8#14
C9	3/4"	9#14
C10	3/4"	10#14
C12	3/4"	12#14
C16	1"	16#14
C20	1"	20#14
C30	1"	30#14
C60	2"	60#14
C64	2"	64#14
C120	2 1/2"	120#14

NOTE: CONDUIT AND CONDUCTOR SIZES ARE TO BE PER THE ABOVE SCHEDULES UNLESS OTHERWISE NOTED.



NGINEERING, INC.	150 Grossman Drive, Suite 309 Braintree, Massachusetts 02184 617 221-9220 web: www.sar.com	

SCALE VI	ERIFICATIO	١
	1 INCH IN LENGT NAL DRAWING	7
0	1"	
SHEET A	1 INCH ON THIS	

ORIGINAL DRAWING SIZE IS 22 x 34

ELECTRICAL CONTROL & RISER DIAGRAMS

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



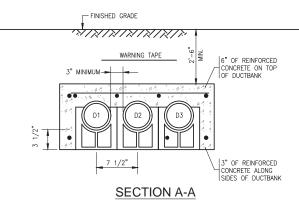
TOWN OF MILLIS
DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION
900 MAIN ST, MILLIS, MA 02054

#### 60% DESIGN

- 1		
1	PROJECT NO. 20212063.003A	
1	ISSUE DATE SEPT. 2021	
1	CURRENT REVISION	
1	DESIGNED BY MC	
	DRAWN BY RLB	
1	CHECKED BY MC	
╛	APPROVED BY MC	SI

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SHEET 39 of 46

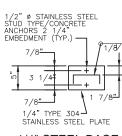


#### NOTES:

- BACKFILL DUCT BANK IN LAYERS AND MANUALLY TAMP OR "PUDDLE" CONCRETE FILL. PROVIDE RED DUCT BANK MARKER TAPES, READING "CAUTION – ELECTRICAL LINES BELOW", OVER ENTIRE LENGTH OF DUCTLINE. LOCATE TAPES 12 INCHES BELOW GRADE. PROVIDE A TAPE FOR EVERY 12 INCHES OF WIDTH OF DUCTLINE.
- 2. A MINIMUM OF 12" SEPARATION SHALL BE KEPT BETWEEN DUCT BANK SECTIONS WITHIN SAME TRENCH.

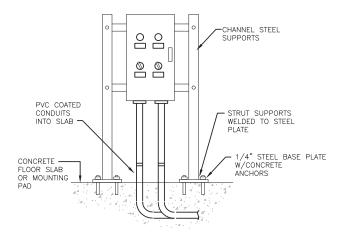
#### DUCTBANK SECTIONS

NO SCALE



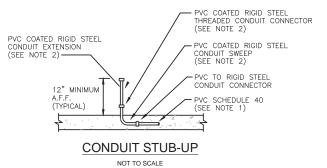
1/4" STEEL BASE PLATE DETAIL

NOT TO SCALE



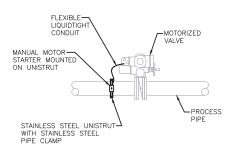
CONTROL PANEL, INSTRUMENTATION AND JUNCTION BOX STANCHION MOUNTING DETAIL

NOT TO SCALE



#### NOTES:

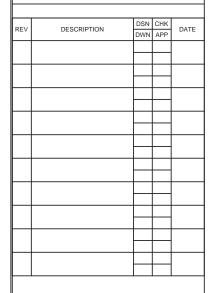
- ALL CONDUIT INSTALLED IN SLAB SHALL BE PVC SCHEDULE 40 EXCEPT ALL SIGNALS CONDUITS AND VFD MOTOR FEEDERS SHALL BE RIGID STEEL.
- ALL PVC COATED RIGID STEEL CONDUIT WHICH HAS BEEN FIELD CUT OR DAMAGED SHALL BE SPRAYED OR PAINTED WITH A PVC COATING ACCEPTABLE FOR USE 10 REPAIR OR SEAL PVC COATED RIGID STEEL CONDUIT. ONLY MANUFACTURER APPROVED PVC COATING SEALANT SHALL BE ACCEPTABLE.



## MOTORIZED VALVE MANUAL MOTOR STARTER MOUNTING

NOT TO SCALE







SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH
ON ORIGINAL DRAWING

1 1'

IF IT'S NOT 1 INCH ON THIS
SHEET ADJUST YOUR
SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

ELECTRICAL
CONTROL WIRING DIAGRAMS

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



TOWN OF MILLIS DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 900 MAIN ST, MILLIS, MA 02054

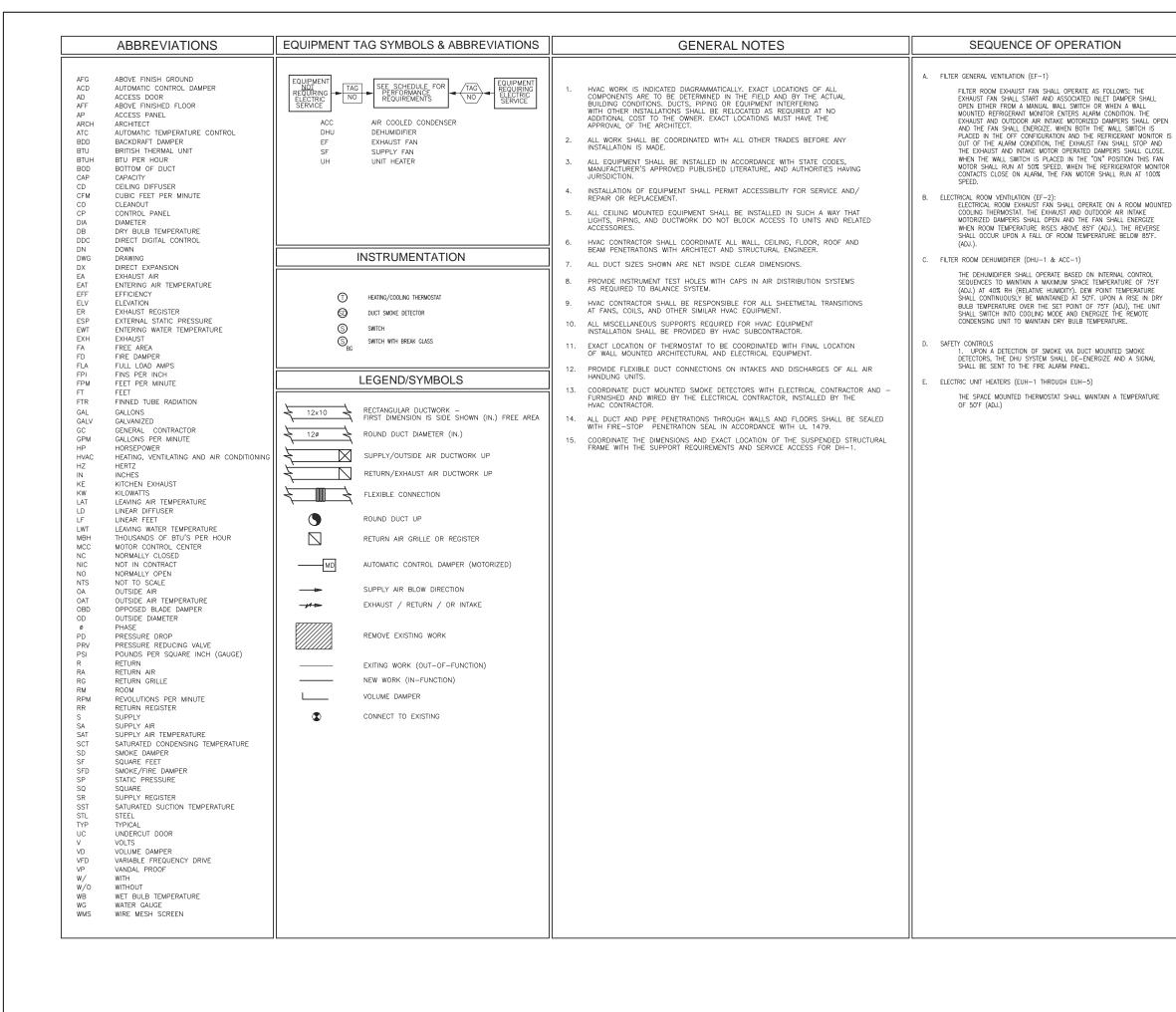
#### 60% DESIGN

١	00702	
ı	PROJECT NO. 20212063.003A	
ı	ISSUE DATE SEPT. 2021	
ı	CURRENT REVISION	
ı	DESIGNED BY MC	
ı	DRAWN BY RLB	
ı	CHECKED BY MC	
	APPROVED BY MC	SHEET

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CAD FILE: W:Veer - 2021/21009.00 - Millis WTP PEAS Treament/Electrical Department/21019.0



KLEINFELDER Bright People. Right Solutions.

DEV/				DATE
REV	DESCRIPTION	DWN	APP	DATE
			-	
			_	
		_	_	

SCALE VERIFICATION HIS BAR IS 1 INCH IN LENG ON ORIGINAL DRAWING

Devi CHK

IF IT'S NOT 1 INCH ON THIS

SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

HVACLEGEND AND GENERAL NOTES

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISIO 900 MAIN ST, MILLIS, MA 02054

#### 60% DESIGN

	20212063.003A	PROJECT NO.
	SEPT. 2021	ISSUE DATE
	ISION	CURRENT REV
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	RLB	DRAWN BY
	RHB	CHECKED BY
SHI	MC	APPROVED BY

H-1



REV	DESCRIPTION		CHK	DATE
IXL V	DESCRIPTION	DWN	APP	DAIL
-			_	

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH
ON ORIGINAL DRAWING

0 1"

IF IT'S NOT 1 INCH ON THIS
SHEET ADJUST YOUR
SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

HVAC FLOOR PLAN

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 900 MAIN ST, MILLIS, MA 02054

#### 60% DESIGN

	00702
PROJECT NO.	20212063.003A
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CURRENT REV	ISION
DESIGNED BY	RHB
DRAWN BY	RLB
CHECKED BY	RHB
APPROVED BY	MC

H-2

SHEET 42 of 46

1 PROVIDE HUMIDITY AND TEMPERATURE CONTROLLER TYPICAL TO DESERT AIRE MODEL CA2500 AND R-407C REFRIGERANT.

DEHUMIDIFIER SCHEDULE

EUH	ELECTRIC HEATER SCHEDULE												
		CAPACITY	FAN DATA										
TAG NO.	LOCATION	KW	CFM	٧	PH	HZ	MANUFACTURER MODEL NUMBER	REMARKS					
EUH-1	PFAS AREA	10.0	-	480	3	60	QMARK MUH104						
EUH-2	PFAS AREA	10.0	-	480	3	60	QMARK MUH104						
EUH-3	PFAS AREA	10.0	-	480	3	60	QMARK MUH104						
EUH-4	PFAS AREA	10.0	-	480	3	60	QMARK MUH104						
EUH-5	ELECTRIC ROOM	3.0	350	480	3	60	QMARK MUH0341						

	REMOTE CONDENSER SCHEDULE										
TAG NO.	MANUFACTURER MODEL NO.	REFRIG	AMBIENT TEMP.	FANS		ELECTRICA	L DATA		RFMARKS		
NO.	OR EQUAL	TYPE	(°F)	QTY	MCA	MOPD	VOLTS	PHASE	INLIMATING		
ACC-1	DESERT AIRE RC5S099C4H23500	R-407C	95	3	6.5	15	480	3			

EF		FAN SCHEDULE											
					SPEED (RPM)		ELECTRICAL DATA			ΓΑ			
TAG NO.	SERVICE	FAN TYPE	CFM	(IN WC)	FAN	MOTOR	HP	٧	PH	H HZ MANUFACTURER & MODEL NUMBER		REMARKS	
EF-1	PFAS AREA	WALL MOUNTED DOME	1450	0.40	1410	1725	1/2	120	1	60	GREENHECK CUE-120-VG	003	
EF-2	ELECTRICAL ROOM	WALL MOUNTED PROP.	100	0.40	-	-	ı	120	1	60	GREENHECK SE-1-8	003	

① PROVIDE THERMAL OVERLOAD MOTOR AND STAINLESS STEEL BIRDSCREEN.
② PROVIDE MOTOR COVER/BELT GUARD, TEFC FAN MOTOR, INLET FLEX DUCT CONNECTION, AND OUTLET WIRE MESH SCREEN.

—BASE RAIL WELD

/ISOLATOR

NO SCALE

ANCHOR TO CURB & BASE RAIL



REV	DESCRIPTION		СНК	DATE
		DWN	APP	
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SCALE VERIFICATION THIS BAR IS 1 INCH IN LENGT ON ORIGINAL DRAWING

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

HVAC SCHEDULES

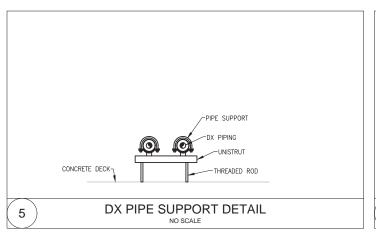
TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES

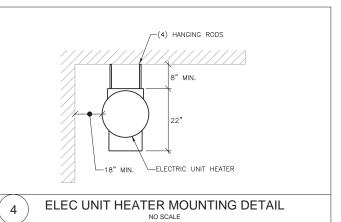


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	20212063.003A	PROJECT NO.
	SEPT. 2021	ISSUE DATE
	ISION	CURRENT REV
	RHB	DESIGNED BY
	RLB	DRAWN BY
	RHB	CHECKED BY
SHE	MC	APPROVED BY

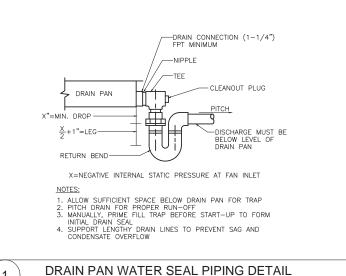
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CT NO.	20212063.003A		
DATE	SEPT. 2021		
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KED BY	RHB		
OVED BY	MC	SHEET	



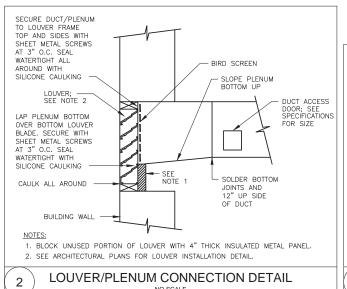


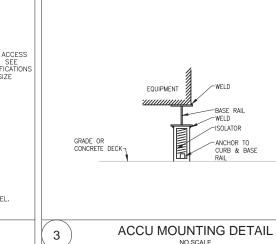
ELECTRICAL DATA

REMARKS



NO SCALE





NO SCALE

- ALL EQUIPMENT AND MATERIALS FURNISHED UNDER THE PLUMBING SUB-CONTRACT, LABOR AND TESTING PERFORMED HEREIN SHALL BE IN COMPLETE ACCORDANCE WITH THE STATE BUILDING CODE, LOCAL FUEL GAS AND PLUMBING CODES, ALL LOCAL CODES AND REGULATIONS, NATIONAL FIRE PROTECTION ASSOCIATION, INSURANCE REGULATIONS AND REQUIREMENTS GOVERNING SUCH WORK.
- 3. ANY AND ALL PERMITS REQUIRED FOR INSTALLATION OF ANY MATERIAL SHALL BE OBTAINED AS PART OF THE WORK OF THE SPECIFICATION INCLUDING ALL FEES OR EXPENSES INCURED.
- WHERE WATER PIPING IS SHOWN DROPPING INTO PLUMBING CHASES WITH SIZES NOTED, THAT SIZE SHALL BE BE CARRIED FULL LENGTH THROUGH THE CHASE. REFER TO PLUMBING FIXTURE SCHEDULE ON THIS DRAWING FOR INDIVIDUAL FIXTURE CONNECTION SIZES.
- 5. UNLESS OTHERWISE NOTED, ALL HORIZONTAL DRAINAGE PIPING WHICH IS 3" OR LESS IN DIAMETER SHALL PITCH OF NOT LESS THAN 1/4" PER FOOT AND ALL HORIZONTAL DRAINAGE PIPING WHICH IS 4" OR LARGER IN DIAMETER SHALL PITCH OF NOT LESS THAN 1/8" PER FOOT.
- ALL BELOW FLOOR PIPING THAT INTERSECTS A GRADE BEAM REQUIRES COORDINATION WITH STRUCTURAL. FOR STRUCTURAL DETAILS, REFER TO STRUCTURAL DRAWINGS.
- . PROVIDE ALL FLOOR CLEANOUTS WITH HUB AND SPIGOT, LEAD AND OAKUM JOINTS FROM CLEANOUT TO AND INCLUDING CONNECTION TO SANITARY OR STORM DRAIN.
- 8. REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATION OF ALL PLUMBING FIXTURES AND EQUIPMENT.
- ALL BURIED DOMESTIC WATER PIPING, TEMPERED WATER PIPING OR AIR PIPING SHALL BE SOFT ROLLED ""COPPER COIL AND BE PROTECTED WITH A HIGH DENSITY RUBBER INSULATION. FITTINGS SHALL NOT BE PERMITTED IN OR UNDER SLAB. PROVIDE SLAB PENETRATIONS WITH SLEEVE AND FIRE STOPPING.
- 10. MISCELLANEOUS DISCREPANCIES OR OMMISSIONS WHICH MIGHT APPEAR ON THE PLANS OR SPECIFICATIONS WILL NOT RELIEVE THE PLUMBING SUB-CONTRACTOR OF CODE COMPLIANCE.
- 11. ALL FLOOR DRAINS SHALL BE PROVIDED WITH A TRAP PRIMER CONNECTION. THIS CONTRACTOR SHALL PROVIDE ALL ASSOCIATED EQUIPMENT NECESSARY TO PROVIDE A COMPLETE SYSTEM INCLUDING AN ELECTRONICALLY OPERATED PRIMING MANIFOLD AND ALL ASSOCIATED PIPING REQUIRED.

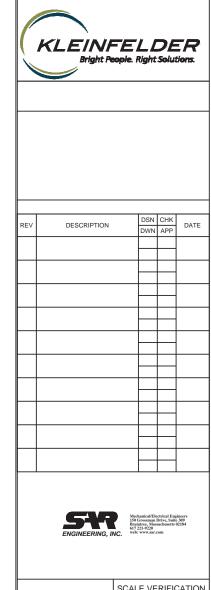
	PLUMBING FIXTURE SCHEDULE											
DESIGNATION	DESIGNATION FIXTURE DESCRIPTION CONNECTION SIZE						REMARKS					
		CW	HW	TW	S/W	V						
НВ	HOSE BIBB	1/2"	-	-	-	-	INTEGRAL VACUUM BREAKER W/ VANDAL RESISTANT "T" HANDLE KEY - SEE NOTE 2					
WH	WALL HYDRANT	1/2"	-	-	-	-	NON-FREEZE, QUARTER TURN, INTEGRAL VACUUM BREAKER W/ VANDAL RESISTANT "T" HANDLE KEY - SEE NOTE 2					
FD	FLOOR DRAIN	-	-	-	2"	2"	SEE SPECIFICATION. PROVIDE WITH TRAP PRIMER.					

- NOTES:
  1. PROVIDE FLOW SWITCH WITH SINGLE POLE, DOUBLE THROW CONTACTS, AND 20 GPM BALANCING REGULATOR (G6040).
- 2. MOUNT FIXTURE 4-0" AFF
  3. PROVIDE DIAL THERMOMETER ON INLETS.
  4. ALL EXPOSED VALVES, PIPING AND FITTINGS SHALL BE CHROME PLATED.

SHOCK ABSORBER SCHEDULE*							
PDI RATING SYMBOL	А	В	С	D	E		
PRECISION PLUMBING PRODUCTS	SC-500	SC-750	SC-1000	SC-1250	SC-1500		
WATTS REGULATOR COMPANY	0750030	0750053	0750060	0750070	0750090		
WADE	5-P	10-P	20-P	50-P	75-P		

\* MANUFACTURERS NAMES AND MODEL NUMBERS ARE SHOWN ONLY TO REPRESENT TYPE, STYLE AND LEVEL OF QUALITY EXPECTED, SIMILAR PRODUCTS BY OTHER MANUFACTURERS WILL BE ACCEPTABLE.

PLUMBING LEGEND							
SYMBOL	ABBREVIATION	<u>DESCRIPTION</u>					
		ABOVE FLOOR PIPING (INDICATED AS SINGLE LINEWORK					
		BELOW FLOOR PIPING (INDICATED AS DOUBLE LINEWOR					
		NEW WORK (INDICATED AS HEAVY LINEWORK)					
	CW	COLD WATER					
	S/W	SANITARY DRAINAGE (SOIL/WASTE)					
<b>—</b> ∘	UP	UP (PENETRATES LEVEL ABOVE)					
<b>-</b> ⇒		RISE (BUT DOES NOT PENETRATE LEVEL ABOVE)					
<b></b> ⇒	DN	DOWN (PENETRATES LEVEL BELOW)					
<b></b> ⇒	DP	DROP (BUT DOES NOT PENETRATE LEVEL BELOW)					
		DIRECTION OF FLOW					
<del>, ►</del> .01		DIRECTION & DESIGNATION OF SLOPE (IN FT/FT)					
<del></del>		SHUTOFF VALVE					
<del></del>	BVA	BALANCING VALVE ASSEMBLY					
<del></del>	CV	CHECK VALVE					
<del>-&gt;4</del> 11	DV	DRAIN VALVE WITH HOSE THREADS					
<b>9</b>	PG	PRESSURE GAUGE					
φ	SA	SHOCK ABSORBER					
—	CO	CLEANOUT					
<del>¯</del>	WCO	WALL CLEANOUT					
<u> </u>	FC0	FLOOR CLEANOUT					
•	FD	FLOOR DRAIN					
$\rightarrow$	HB	HOSE BIBB					
$\rightarrow$	WH	WALL HYDRANT					
	NIPC	NOT IN PLUMBING CONTRACT					
	PC	PLUMBING CONTRACTOR					
	NO	NORMALLY OPEN					
	NC	NORMALLY CLOSED					
	INV	INVERT ELEVATION					
	CFH	CUBIC FEET PER HOUR					
	W&T	WASTE & TRAP					
<del>-&gt;&gt;</del>	VIV	VALVE IN VERTICAL					
∞	OED	OPEN END DRAIN					
	VTR CC	VENT THRU ROOF  CAPPED CONNECTION					
	UN	UNION UNION					
	ST	UNION STRAINER					
1,5,	WTS	WATER TIGHT SLEEVE					
<del></del>	P	PLUMBING FIXTURE DESIGNATION					
0	WM	WATER METER					
Ō	RPBP	REDUCED PRESSURE BACKFLOW PREVENTER					
	TWH	TANKLESS WATER HEATER					
	FFE	FINISHED FLOOR ELEVATION					
	LPC	LIMIT PLUMBING CONTRACT					
	TDL	TOTAL DEVELOPED LENGTH					



SCALE VERIFICATION THIS BAR IS 1 INCH IN LENGT ON ORIGINAL DRAWING

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

PLUMBING LEGEND, GENERAL NOTES AND SCHEDULES

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 900 MAIN ST, MILLIS, MA 02054

60% DESIGN

	00,02	
PROJECT NO.	20212063.003A	
ISSUE DATE	SEPT. 2021	
CURRENT REV	ISION	
DESIGNED BY	RLB	
DRAWN BY	RLB	
CHECKED BY	JL	
APPROVED BY	MC	SH

P-1

KLEINFELDER
Bright People. Right Solutions.

REV	DESCRIPTION		СНК	DATE
IXL V	DESCRIPTION	DWN	APP	DAIL



ORIGINAL DRAWING SIZE IS 22 x 34

PLUMBING FLOOR PLAN

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES

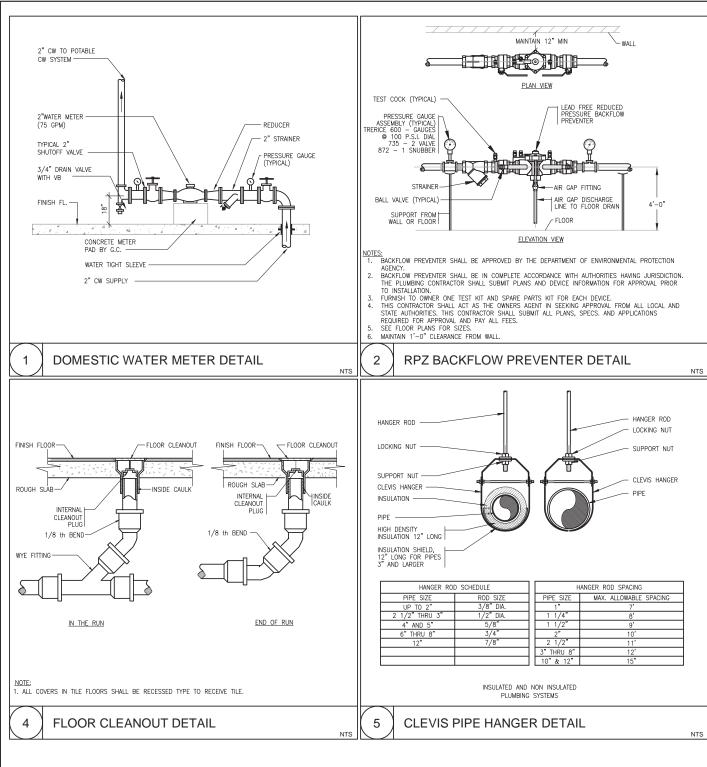


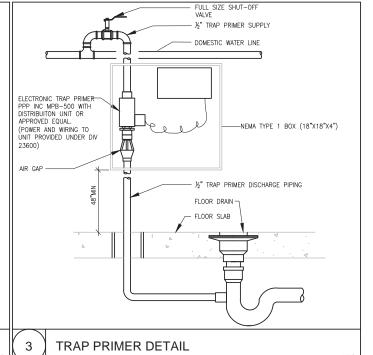
TOWN OF MILLIS
DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION
900 MAIN ST, MILLIS, MA 02054

60% DESIGN

PROJECT NO.	20212063.003A	
ISSUE DATE	SEPT. 2021	
CURRENT REV	/ISION	
DESIGNED BY	RLB	
DRAWN BY	RLB	
CHECKED BY	JL	
APPROVED BY	MC MC	SHEET

P-2





KLEINFELDER
Bright Reople. Right Solutions.

REV	DESCRIPTION		CHK	DATE
KLV	DESCRIPTION	DWN	APP	DATE

	SCALE VERIFICATION
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THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

> IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

PLUMBING DETAILS

TOWN OF MILLIS, MASSACHUSETTS D'ANGELIS WTP PFAS UPGRADES



DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 900 MAIN ST, MILLIS, MA 02054

#### 60% DESIGN

	20212063.003A	PROJECT NO.
	SEPT. 2021	ISSUE DATE
	ISION	CURRENT REV
	RLB	DESIGNED BY
	RLB	DRAWN BY
	JL	CHECKED BY
SHE	MC	APPROVED BY

P-3

46 of 46

PLOTTED: 9/2/2021 12:54 PM BY:



# ATTACHMENT E Stormwater Report

## D'Angelis WTP PFAS Upgrades

in

## Millis, Massachusetts

## STORMWATER MANAGEMENT REPORT

October 12, 2021

#### Prepared for:

Town of Millis Department of Public Works Engineering Division 900 Main Street, Millis, MA 02054

#### Prepared by:

Kleinfelder One Beacon Street, Suite 8100 Boston, MA 02108

## STORMWATER MANAGEMENT PLAN TABLE OF CONTENTS

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2	REGULATORY STANDARDS	
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	2.11 STANDARD 10: ILLICIT DISCHARGES	

#### **ATTACHMENTS**

#### **Attachments**

- A Pre-Development Drainage Delineations and Model Output
- B Post-Development Drainage Delineations and Model Output
- C Operation and Maintenance Plan and Long-Term Pollution Prevention Plan
- D Millis, MA NRCS Soil Map
- D Natural Heritage Map of Certified Vernal Pools and Priority Habitats

#### **SECTION 1**

#### INTRODUCTION

#### 1.1 PROJECT OVERVIEW

The town of Millis is undertaking a comprehensive upgrade to the water system through the construction of a new water treatment plant. The proposed water treatment plant will be located at the same location of the existing plant at 7 Water Street. The proposed improvements will include the design and construction of a new water treatment building and improve the existing driveway and parking areas to the new building. As part of this upgrade the existing water treatment building and an existing building that was previously used as a dog kennel will be removed.

The site is primarily covered with trees and grass and will remain that way in the post construction condition. The soils on the site consists of Hinckley loamy sand and Merrimac fine sandy loam with a hydrologic soil group rating of A (see appendix for soil map information). Borings were conducted on the site to determine soil consistency and groundwater elevations. The borings indicate that the soils on-site consisted of sand and gravel with groundwater approximately 15-feet below surface grade.

The site is located within the Massachusetts Department of Environmental Protection (DEP) Water Supply Protection Area – Zone I, Zone II and IWP. The site does not have any rare and endangered species present according to the Massachusetts GIS online mapping tool, Oliver.

1

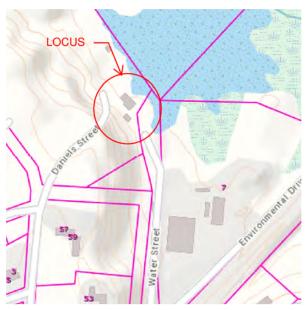


Figure 1: Site Location

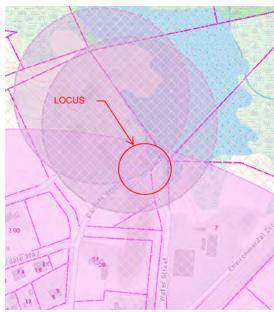


Figure 2: Zone I, Zone II and IWP Areas

In accordance with the Massachusetts Stormwater Rules and Regulations, the water treatment improvements at the existing Millis DPW/Water Treatment property is considered a redevelopment project. Since the site is located in a Zone I Water Supply Protection Area, stormwater Best Management Practices (BMP's) may not be located on the site. The improvements at the DPW/Water Treatment property have been designed to keep the existing drainage patterns at the site intact. The existing impervious area from the existing buildings and pavement area to be removed and modified/improved is 9,595 S.F. The proposed building and pavement/site improvement impervious area is 11,995 S.F. for an increase in impervious area of 2,400 S.F.

The DPW site was analyzed on the southern portion of the property at the existing Bordering Vegetative Wetland (BVW). The existing and proposed water treatment plant site discharges to one compliance point: (1) to the south at the property line and BVW.

• Compliance Point 1 (South wetland): There is no formal drainage system with this compliance point and stormwater sheetflows to the wetland. Stormwater from the building's discharge to the ground and runoff from the buildings, pavement and surrounding areas, sheetflow to the BVW.

Proposed drainage patterns and stormwater best management practices within the compliance point include:

• Compliance Point 1 (South wetlands): Drainage patterns for the proposed conditions will mimic existing conditions flow patterns. Stormwater from the proposed water treatment building will be collected by roof gutters and discharge to a subsurface infiltration system through downspouts and piping that is located northwest of the proposed water treatment building at the approximate location of the dog kennel building. All other site conditions will remain unchanged from pre-construction to post-constion.

The purpose of this report is to summarize the drainage analysis and erosion and sediment controls for the project area and demonstrate its compliance with the Massachusetts Stormwater Standards, and the Millis Stormwater Regulations.

The project's construction period is expected to take approximately 14 months to complete.

#### **SECTION 2**

#### REGULATORY STANDARDS

#### 2.1 ORGANIZATION OF THE REGULATORY STANDARDS SECTION

This Section of the Stormwater Management Plan (SMP) is organized to describe the Ten Massachusetts Stormwater Standards, consistent with Section 7 of the Stormwater Management By-Law, which are listed below:

Standard #1: No New Untreated Discharges

Standard #2: Post-development Peak Discharge Rates

Standard #3: Recharge to Groundwater

Standard #4: 80% TSS Removal

Standard #5: Higher Potential Pollutant Loads

Standard #6: Protection of Critical Areas

Standard #7: Redevelopment Projects

Standard #8: Erosion & Sedimentation Control Plan

Standard #9: Operation & Maintenance Plan

Standard #10: Illicit Discharges

For redevelopment projects, the project is required to meet these standards to the maximum extent practicable for standards 1 through 6. Other provisions in standards 7 through 10 shall comply with the provisions in the standards.

#### 2.2 STANDARD 1: NO NEW UNTREATED DISCHARGES

Under Standard 1, no new untreated discharges are allowed. Under the proposed conditions, no new untreated discharges have been created and all existing discharges will remain unchanged in the post construction condition.

No new discharge will be conveyed to the wetland and proposed conditions will mimic existing conditions.

#### 2.3 STANDARD 2: POST-DEVELOPMENT PEAK DISCHARGE RATES

Under Standard 2, the proposed project will not result in an increase in the post-development peak discharge rates for any 24-hour storm events. The post-construction flow patterns will remain unchanged from the pre-construction conditions. The proposed new water treatment building will

collect and discharge stormwater to the subsurface infiltration system and will capture and infiltrate 100% of the 100-year 24-hour storm event. The post construction conditions will have a decrease in post-development peak discharge rates as depicted below.

24-Hr Rainfall Event	Pre-Construction Peak Runoff	Post-Construction Peak Runoff
	Rate	Rate
2-YR	0.15	0.14
10-YR	1.05	1.02
25-YR	2.22	2.14
100-YR	5.18	4.99

#### 2.4 STANDARD 3: RECHARGE TO GROUNDWATER

Stormwater Standard 3 requires that the loss of annual recharge to groundwater be eliminated or minimized through the use of environmentally sensitive site design, based on the hydrologic soil group. The project site is comprised of hydrologic soil group (HSG) A (Attachment). The soils present on the site are Hinckley loamy sand and Merrimac fine sandy loam, HSG A soils, which are highly draining soils with a low runoff potential. The post-construction conditions will have an increase in impervious pavement of 2,400 S.F. The area of the proposed water treatment building is 9,045 S.F. and it will recharge 100% of the building area up to the 100-year, 24-hour storm event.

#### 2.5 STANDARD 4: 80% TSS REMOVAL

Standard 4 requires the design of stormwater management features to remove 80% of the average annual post-construction load of total suspended solids (TSS). Since stormwater discharges are prohibited to a Zone I, this criterion cannot be met. However, roof runoff will be directed to a subsurface infiltration system.

#### 2.6 STANDARD 5: HIGHER POTENTIAL POLLUTANT LOADS

The project site is not considered a land use with higher potential pollutant loads and therefore this standard does not apply.

#### 2.7 STANDARD 6: PROTECTION OF CRITICAL AREAS

The project site is not considered for protection of critical areas and therefore this standard does not apply.

4

#### 2.8 STANDARD 7: REDEVELOPMENT PROJECTS

The project site is considered a redevelopment project. The site will have an increase of 2,400S.F. of impervious area. To mitigate this increase the entire proposed roof area will capture all stormwater events up to the 100-year, 24-hour storm event and infiltrate the captured stormwater.

#### 2.9 STANDARD 8: EROSION & SEDIMENT CONTROL PLAN

#### 2.9.1 Implementation of Erosion and Sedimentation Controls

Prior to the start of any earthwork on the site, the sedimentation and erosion controls shall be installed.

#### 2.9.2 Inspection and Maintenance of Stormwater Controls

Stormwater controls must be maintained in good operating condition until all disturbed soils are permanently stabilized. To ensure this, the following areas will be inspected by the Contractor every week and after every rainfall event of 0.5 inches or greater:

The following standard maintenance practices will apply to the erosion and sedimentation controls for the project:

- All erosion and sediment control measures will be properly maintained. If repairs or other maintenance is necessary, it will be initiated by the Contractor within 24 hours of report;
- Straw Waddles will be inspected for depth of sediment, tears, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground;
- Built up sediment will be removed from straw waddles when it has reached one-half the height of the fence and at end of the job;
- Erosion control measures will be maintained for disturbed areas of the site that have not been stabilized;
- Erosion control measures will be installed and maintained for the construction staging area, stockpiles, and material storage areas until those areas have been stabilized after construction; and,
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth.

If the inspections reveal the need for additional control devices to prevent erosion and sedimentation, the Contractor will promptly install additional protection devices as required. Control devices in need of repair will be repaired promptly after identification. A stockpile of 100 linear feet of straw waddles will be maintained on the site and under cover for emergency repairs and routine maintenance.

The Owner (or their representative) will be responsible for preparing an inspection and maintenance report following each inspection and filing completed reports after maintenance action has taken place by the Contractor. The Contractor's superintendent will be responsible for maintenance and repair activities and completing and signing the maintenance action portion of inspection and maintenance reports.

#### 2.9.3 Stormwater Controls for Construction Period

#### **EROSION AND SEDIMENT CONTROLS:**

- 1. Temporary stabilization measures shall be instituted to minimize effects of sedimentation and erosion during construction.
- 2. Permanent stabilization measures shall be employed to minimize effects of sedimentation and erosion after the completion of construction.

#### 2.10 STANDARD 9: OPERATION & MAINTENANCE PLAN

Due to the nature and intensity of the proposed redevelopment project, the site is not anticipated to generate any significant TSS or pollutant loads. As such, inspection activities at the site should be focused on the development or potential for development, of any erosion issues.

To ensure compliance with all applicable stormwater regulations, and as a measure of good housekeeping, inspection and maintenance personnel shall maintain an operation and maintenance log for the last three years. The operation and maintenance log shall include inspections, repairs, replacements and disposals (for disposals, the log shall indicate the type of material and the disposal location). The operation and maintenance plan is included as Attachment B.

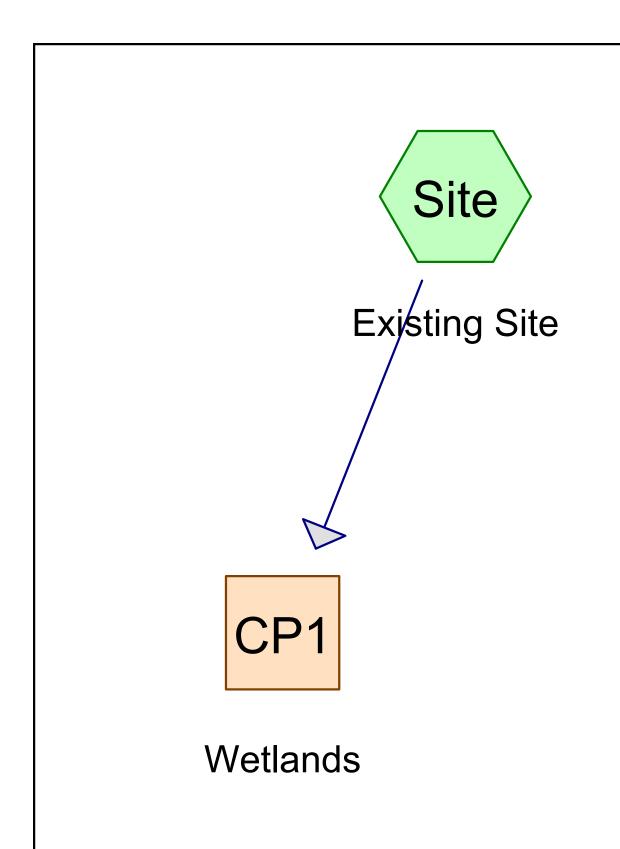
#### 2.11 STANDARD 10: ILLICIT DISCHARGES

There are no known illicit discharges in the area of the project.

# STORMWATER MANAGEMENT REPORT APPENDICES

## **APPENDIX A**

Hydrologic Computer Model and Catchment Area Plans Pre-Construction











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## Area Listing (all nodes)

Are	a CN	Description	
(acres	s)	(subcatchment-numbers)	
0.12	4 76	Gravel roads, HSG A (Site)	
0.23	8 98	Paved roads w/curbs & sewers, HSG A (Site)	
0.05	6 98	Roofs, HSG A (Site)	
1.41	4 43	Woods/grass comb., Fair, HSG A (Site)	
1.83	32 54	TOTAL AREA	

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Page 3

## Soil Listing (all nodes)

Area	Soil	Subcatchment
(acres)	Group	Numbers
1.832	HSG A	Site
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.832		TOTAL AREA

Existing Conditions
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## **Ground Covers (all nodes)**

 HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
 0.124	0.000	0.000	0.000	0.000	0.124	Gravel roads	Sit
							е
0.238	0.000	0.000	0.000	0.000	0.238	Paved roads w/curbs & sewers	Sit
							е
0.056	0.000	0.000	0.000	0.000	0.056	Roofs	Sit
							е
1.414	0.000	0.000	0.000	0.000	1.414	Woods/grass comb., Fair	Sit
							е
1.832	0.000	0.000	0.000	0.000	1.832	TOTAL AREA	

#### **Existing Conditions**

Type III 24-hr 2-Year Rainfall=3.22"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentSite: Existing Site Runoff Area=79,811 sf 16.07% Impervious Runoff Depth=0.23"

Flow Length=160' Tc=14.0 min CN=54 Runoff=0.15 cfs 0.035 af

Reach CP1: Wetlands

Inflow=0.15 cfs 0.035 af
Outflow=0.15 cfs 0.035 af

Total Runoff Area = 1.832 ac Runoff Volume = 0.035 af Average Runoff Depth = 0.23" 83.93% Pervious = 1.538 ac 16.07% Impervious = 0.294 ac

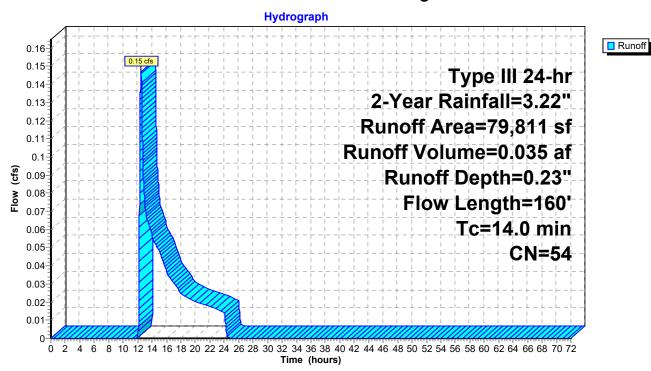
#### **Summary for Subcatchment Site: Existing Site**

Runoff = 0.15 cfs @ 12.48 hrs, Volume= 0.035 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.22"

	Α	rea (sf)	CN E	escription					
		10,370	98 F	98 Paved roads w/curbs & sewers, HSG A					
		2,452	98 F	Roofs, HSG	S A				
		5,412		Gravel road	,				
		61,577	43 V	Voods/gras	ss comb., F	Fair, HSG A			
		79,811	54 V	Veighted A	verage				
		66,989	8	3.93% Per	vious Area	l e e e e e e e e e e e e e e e e e e e			
		12,822	1	6.07% Imp	ervious Ar	ea			
	_								
,	Тc	Length	Slope	Velocity	Capacity	Description			
	nin)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	0.4	50	0.1800	2.12		Shallow Concentrated Flow,			
						Woodland Kv= 5.0 fps			
	1.9	25	0.2000	0.22		Sheet Flow,			
						Grass: Dense n= 0.240 P2= 3.27"			
1	1.7	85	0.0230	0.12		Sheet Flow,			
						Grass: Dense n= 0.240 P2= 3.27"			
1	4.0	160	Total						

#### **Subcatchment Site: Existing Site**



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#### **Summary for Reach CP1: Wetlands**

[40] Hint: Not Described (Outflow=Inflow)

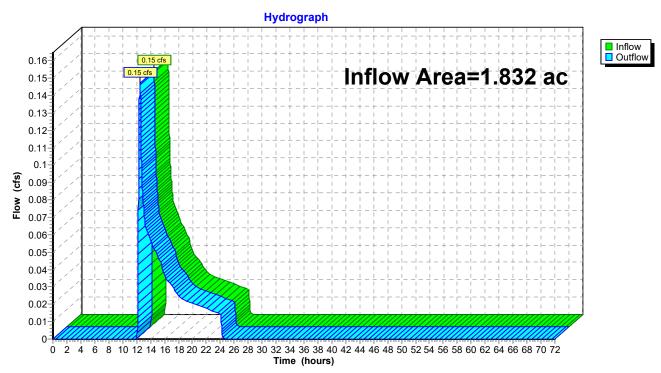
Inflow Area = 1.832 ac, 16.07% Impervious, Inflow Depth = 0.23" for 2-Year event

Inflow = 0.15 cfs @ 12.48 hrs, Volume= 0.035 af

Outflow = 0.15 cfs @ 12.48 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2

#### **Reach CP1: Wetlands**



#### **Existing Conditions**

Type III 24-hr 10-Year Rainfall=4.86" Printed 10/11/2021

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentSite: Existing Site Runoff Area=79,811 sf 16.07% Impervious Runoff Depth=0.85"

Flow Length=160' Tc=14.0 min CN=54 Runoff=1.05 cfs 0.130 af

Reach CP1: Wetlands Inflow=1.05 cfs 0.130 af
Outflow=1.05 cfs 0.130 af

Total Runoff Area = 1.832 ac Runoff Volume = 0.130 af Average Runoff Depth = 0.85" 83.93% Pervious = 1.538 ac 16.07% Impervious = 0.294 ac

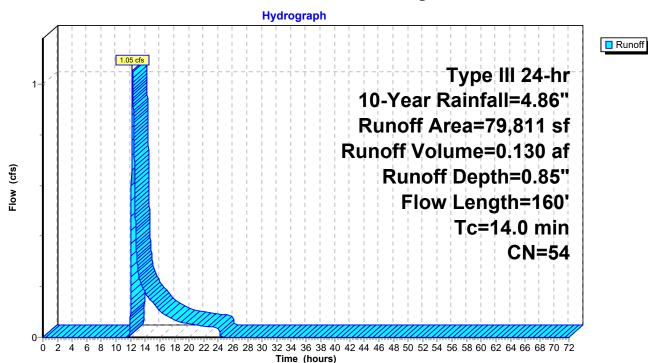
#### **Summary for Subcatchment Site: Existing Site**

Runoff = 1.05 cfs @ 12.24 hrs, Volume= 0.130 af, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.86"

A	rea (sf)	CN E	escription		
10,370		98 F	Paved roads w/curbs & sewers, HSG A		
2,452 98 Roo			Roofs, HSG A		
5,412 76 Gravel roads, HSG A			Gravel road	ls, HSG A	
61,577		43 V	43 Woods/grass comb., Fair, HSG A		
79,811 5		54 V	Weighted Average		
66,989		83.93% Pervious Area			
12,822		16.07% Impervious Area			
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
0.4	50	0.1800	2.12		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
1.9	25	0.2000	0.22		Sheet Flow,
					Grass: Dense n= 0.240 P2= 3.27"
11.7	85	0.0230	0.12		Sheet Flow,
					Grass: Dense n= 0.240 P2= 3.27"
14.0	160	Total			

#### **Subcatchment Site: Existing Site**



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#### **Summary for Reach CP1: Wetlands**

[40] Hint: Not Described (Outflow=Inflow)

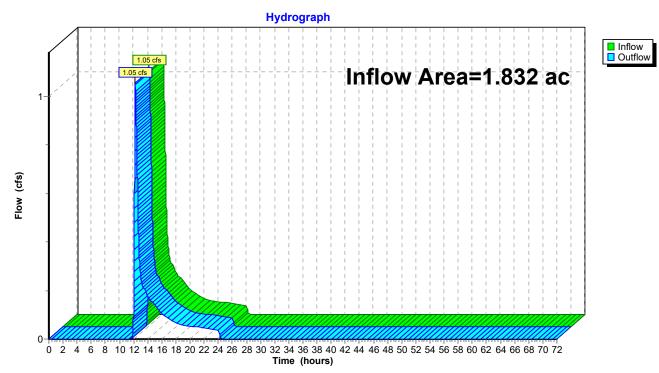
Inflow Area = 1.832 ac, 16.07% Impervious, Inflow Depth = 0.85" for 10-Year event

Inflow = 1.05 cfs @ 12.24 hrs, Volume= 0.130 af

Outflow = 1.05 cfs @ 12.24 hrs, Volume= 0.130 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2

#### **Reach CP1: Wetlands**



## **Existing Conditions**

Type III 24-hr 25-Year Rainfall=6.15"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentSite: Existing Site Runoff Area=79,811 sf 16.07% Impervious Runoff Depth=1.52"

Flow Length=160' Tc=14.0 min CN=54 Runoff=2.22 cfs 0.233 af

Reach CP1: Wetlands Inflow=2.22 cfs 0.233 af
Outflow=2.22 cfs 0.233 af

Total Runoff Area = 1.832 ac Runoff Volume = 0.233 af Average Runoff Depth = 1.52" 83.93% Pervious = 1.538 ac 16.07% Impervious = 0.294 ac

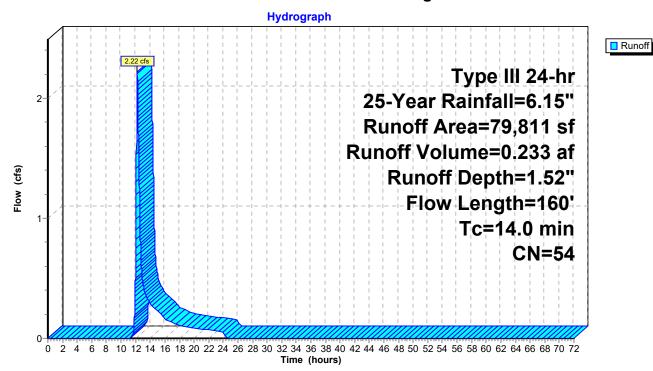
## **Summary for Subcatchment Site: Existing Site**

Runoff = 2.22 cfs @ 12.21 hrs, Volume= 0.233 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.15"

A	rea (sf)	CN D	escription							
	10,370	98 P	98 Paved roads w/curbs & sewers, HSG A							
	2,452	98 F	Roofs, HSG	βA						
	5,412	76 G	Gravel road	ls, HSG A						
	61,577	43 V	Voods/gras	ss comb., F	Fair, HSG A					
	79,811	54 V	Veighted A	verage						
	66,989	8	3.93% Per	vious Area						
	12,822	1	6.07% Imp	ervious Ar	ea					
_				_						
Tc	Length	Slope	Velocity	Capacity	Description					
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)						
0.4	50	0.1800	2.12		Shallow Concentrated Flow,					
					Woodland Kv= 5.0 fps					
1.9	25	0.2000	0.22		Sheet Flow,					
					Grass: Dense n= 0.240 P2= 3.27"					
11.7	85	0.0230	0.12		Sheet Flow,					
					Grass: Dense n= 0.240 P2= 3.27"					
14.0	160	Total								

## **Subcatchment Site: Existing Site**



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## **Summary for Reach CP1: Wetlands**

[40] Hint: Not Described (Outflow=Inflow)

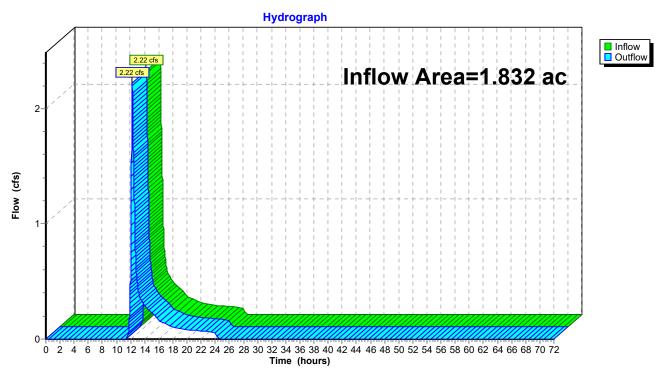
Inflow Area = 1.832 ac, 16.07% Impervious, Inflow Depth = 1.52" for 25-Year event

Inflow = 2.22 cfs @ 12.21 hrs, Volume= 0.233 af

Outflow = 2.22 cfs @ 12.21 hrs, Volume= 0.233 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2

#### **Reach CP1: Wetlands**



## **Existing Conditions**

Type III 24-hr 100-Year Rainfall=8.80" Printed 10/11/2021

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentSite: Existing Site Runoff Area=79,811 sf 16.07% Impervious Runoff Depth=3.22"

Flow Length=160' Tc=14.0 min CN=54 Runoff=5.18 cfs 0.492 af

Reach CP1: Wetlands

Inflow=5.18 cfs 0.492 af
Outflow=5.18 cfs 0.492 af

Total Runoff Area = 1.832 ac Runoff Volume = 0.492 af Average Runoff Depth = 3.22" 83.93% Pervious = 1.538 ac 16.07% Impervious = 0.294 ac

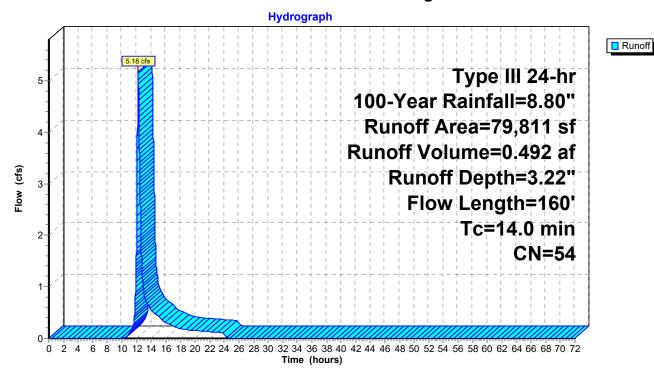
## **Summary for Subcatchment Site: Existing Site**

Runoff = 5.18 cfs @ 12.21 hrs, Volume= 0.492 af, Depth= 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.80"

	Α	rea (sf)	CN E	escription							
		10,370	98 F	98 Paved roads w/curbs & sewers, HSG A							
		2,452	98 F	Roofs, HSG	βA						
		5,412		Gravel road	,						
		61,577	43 V	Voods/gras	ss comb., F	Fair, HSG A					
		79,811	54 V	Veighted A	verage						
		66,989	8	3.93% Per	vious Area	l e e e e e e e e e e e e e e e e e e e					
		12,822	1	6.07% Imp	ervious Ar	ea					
	_										
,	Тc	Length	Slope	Velocity	Capacity	Description					
	nin)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	0.4	50	0.1800	2.12		Shallow Concentrated Flow,					
						Woodland Kv= 5.0 fps					
	1.9	25	0.2000	0.22		Sheet Flow,					
						Grass: Dense n= 0.240 P2= 3.27"					
1	1.7	85	0.0230	0.12		Sheet Flow,					
						Grass: Dense n= 0.240 P2= 3.27"					
1	4.0	160	Total								

## **Subcatchment Site: Existing Site**



## **Summary for Reach CP1: Wetlands**

[40] Hint: Not Described (Outflow=Inflow)

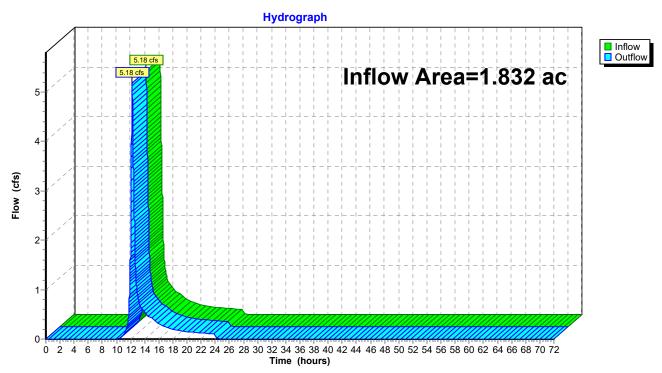
Inflow Area = 1.832 ac, 16.07% Impervious, Inflow Depth = 3.22" for 100-Year event

Inflow = 5.18 cfs @ 12.21 hrs, Volume= 0.492 af

Outflow = 5.18 cfs @ 12.21 hrs, Volume= 0.492 af, Atten= 0%, Lag= 0.0 min

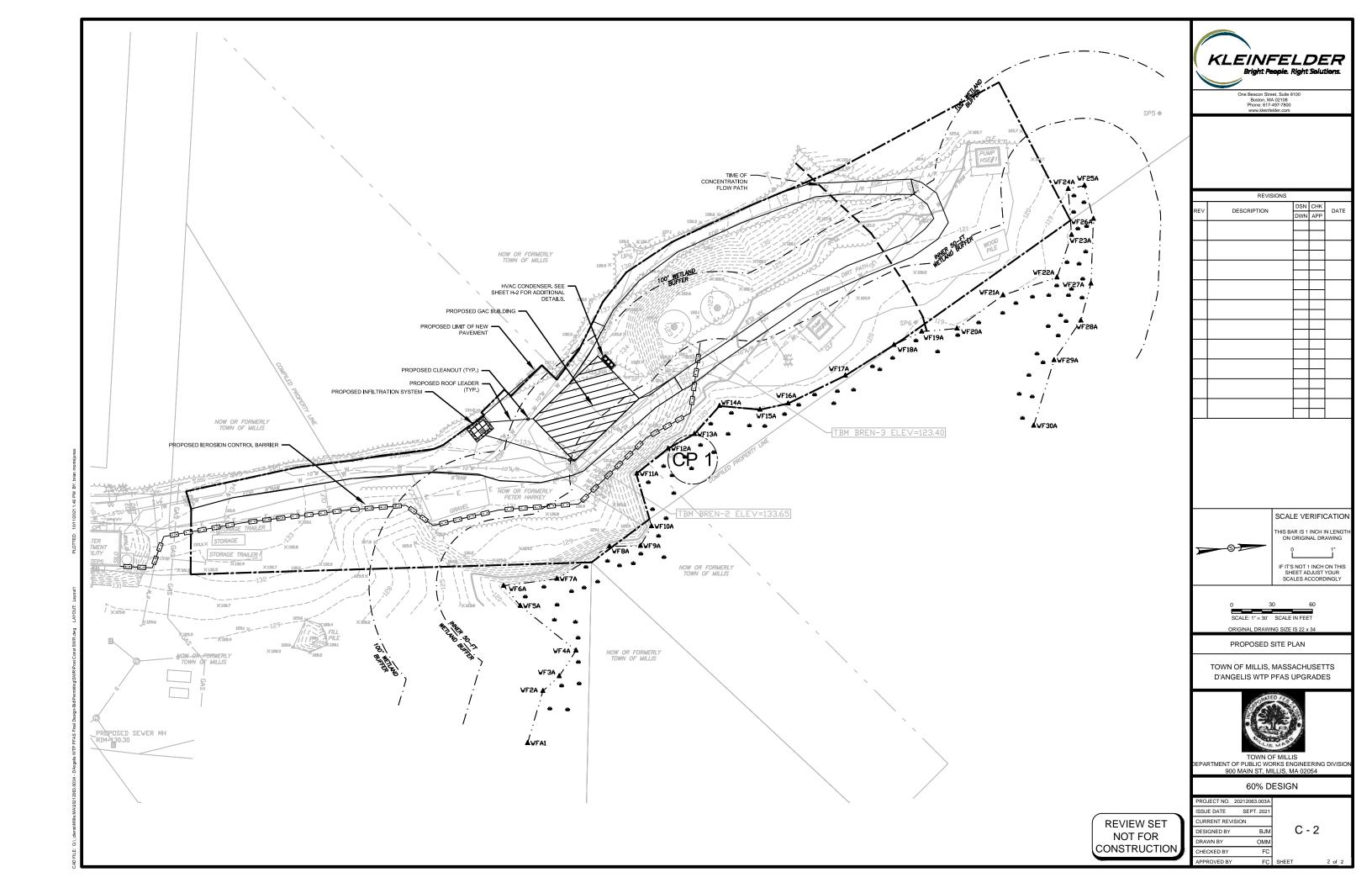
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2

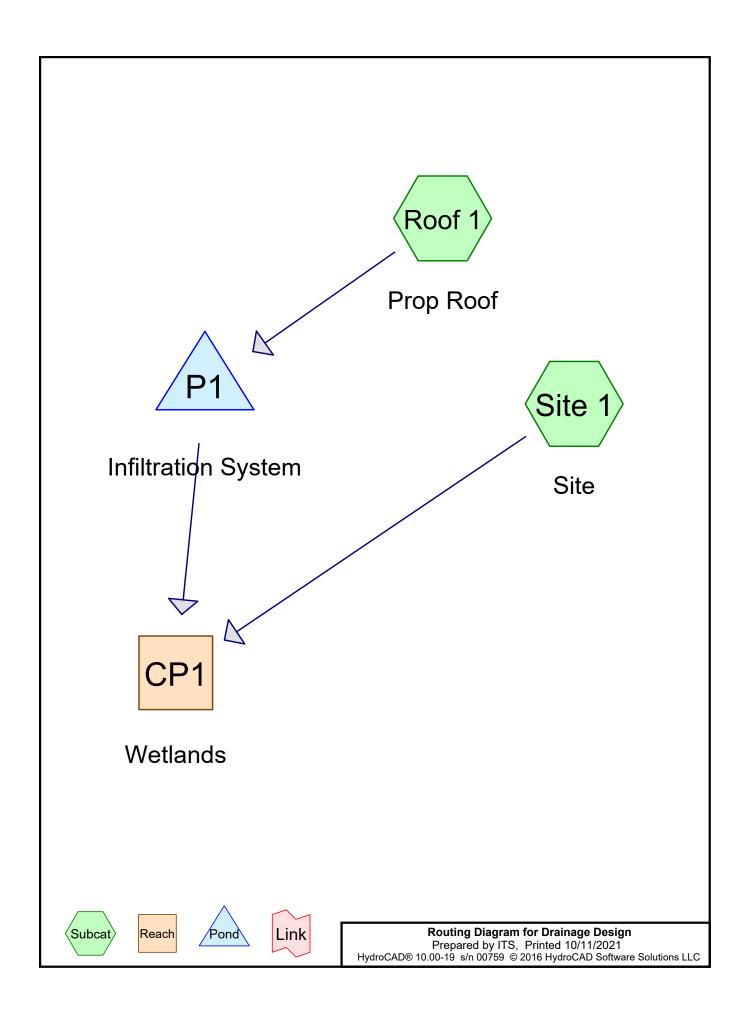
## **Reach CP1: Wetlands**



# **APPENDIX B**

Hydrologic Computer Model and Catchment Area Plans Post-Construction





## Area Listing (all nodes)

Area	CN	Description
(acres)		(subcatchment-numbers)
0.100	76	Gravel roads, HSG A (Site 1)
0.272	98	Paved parking, HSG A (Site 1)
0.077	98	Roofs, HSG A (Roof 1, Site 1)
1.384	43	Woods/grass comb., Fair, HSG A (Site 1)
1.832	55	TOTAL AREA

Drainage Design
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## Soil Listing (all nodes)

Area	Soil	Subcatchment
(acres)	Group	Numbers
1.832	HSG A	Roof 1, Site 1
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.832		<b>TOTAL AREA</b>

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# **Ground Covers (all nodes)**

 HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
 0.100	0.000	0.000	0.000	0.000	0.100	Gravel roads	Site 1
0.272	0.000	0.000	0.000	0.000	0.272	Paved parking	Site 1
0.077	0.000	0.000	0.000	0.000	0.077	Roofs	Roof 1,
							Site 1
1.384	0.000	0.000	0.000	0.000	1.384	Woods/grass comb., Fair	Site 1
1.832	0.000	0.000	0.000	0.000	1.832	TOTAL AREA	

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## Pipe Listing (all nodes)

Line#	Node	In-Invert	Out-Invert	Length	Slope	n	Diam/Width	Height	Inside-Fill
	Number	(feet)	(feet)	(feet)	(ft/ft)		(inches)	(inches)	(inches)
1	P1	133.50	133.25	10.0	0.0250	0.010	4.0	0.0	0.0

**Drainage Design** 

Type III 24-hr 2-Year Rainfall=3.22"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentRoof 1: Prop Roof Runoff Area=2,950 sf 100.00% Impervious Runoff Depth=2.99"

Tc=5.0 min CN=98 Runoff=0.22 cfs 0.017 af

SubcatchmentSite 1: Site Runoff Area=76,861 sf 15.91% Impervious Runoff Depth=0.23"

Flow Length=160' Tc=14.0 min CN=54 Runoff=0.14 cfs 0.034 af

Reach CP1: Wetlands

Inflow=0.14 cfs 0.034 af
Outflow=0.14 cfs 0.034 af

Pond P1: Infiltration System Peak Elev=130.05' Storage=29 cf Inflow=0.22 cfs 0.017 af

Discarded=0.14 cfs 0.017 af Primary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.017 af

Total Runoff Area = 1.832 ac Runoff Volume = 0.051 af Average Runoff Depth = 0.33" 80.98% Pervious = 1.484 ac 19.02% Impervious = 0.348 ac

Runoff

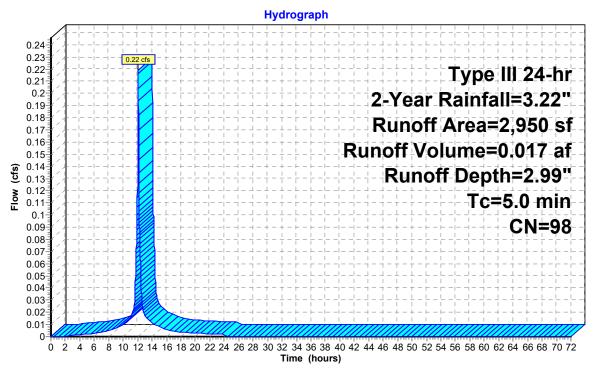
## **Summary for Subcatchment Roof 1: Prop Roof**

Runoff = 0.22 cfs @ 12.07 hrs, Volume= 0.017 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.22"

A	rea (sf)	CN [	Description		
	2,950	98 F	Roofs, HSC	Α	
	2,950	1	100.00% In	npervious A	Area
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

## **Subcatchment Roof 1: Prop Roof**



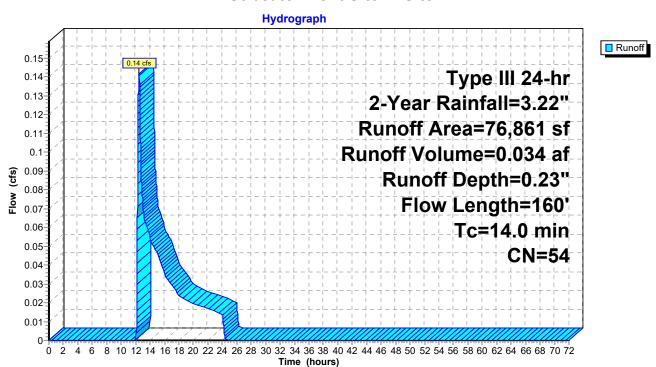
## **Summary for Subcatchment Site 1: Site**

Runoff = 0.14 cfs @ 12.48 hrs, Volume= 0.034 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.22"

A	rea (sf)	CN D	escription		
	11,835	98 P	aved park	ing, HSG A	1
	392	98 F	Roofs, HSG	βA	
	4,336	76 G	Gravel road	ls, HSG A	
	60,298	43 V	Voods/gras	ss comb., F	air, HSG A
	76,861	54 V	Veighted A	verage	
	64,634	8	4.09% Per	vious Area	
	12,227	1	5.91% Imp	ervious Ar	ea
_					
Tc	Length	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
0.4	50	0.1800	2.12		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
1.9	25	0.2000	0.22		Sheet Flow,
					Grass: Dense n= 0.240 P2= 3.27"
11.7	85	0.0230	0.12		Sheet Flow,
					Grass: Dense n= 0.240 P2= 3.27"
14.0	160	Total			

#### **Subcatchment Site 1: Site**



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## **Summary for Reach CP1: Wetlands**

[40] Hint: Not Described (Outflow=Inflow)

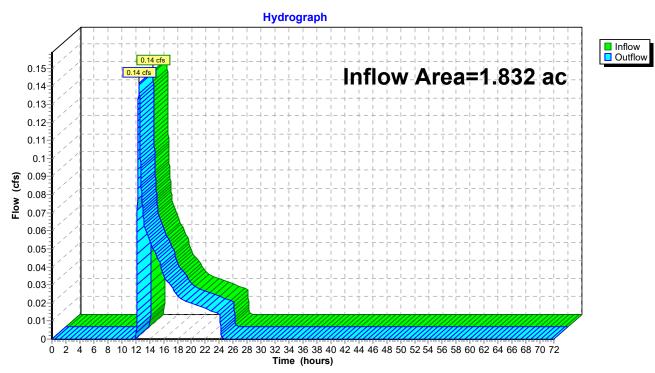
Inflow Area = 1.832 ac, 19.02% Impervious, Inflow Depth = 0.22" for 2-Year event

Inflow = 0.14 cfs @ 12.48 hrs, Volume= 0.034 af

Outflow = 0.14 cfs @ 12.48 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2

#### **Reach CP1: Wetlands**



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## **Summary for Pond P1: Infiltration System**

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=586)

0.068 ac,100.00% Impervious, Inflow Depth = 2.99" for 2-Year event Inflow Area = Inflow 0.22 cfs @ 12.07 hrs, Volume= 0.017 af Outflow 0.14 cfs @ 12.16 hrs, Volume= 0.017 af, Atten= 37%, Lag= 5.3 min Discarded = 0.14 cfs @ 12.16 hrs, Volume= 0.017 af 0.00 hrs, Volume= Primary 0.00 cfs @ 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2 Peak Elev= 130.05' @ 12.16 hrs Surf.Area= 588 sf Storage= 29 cf

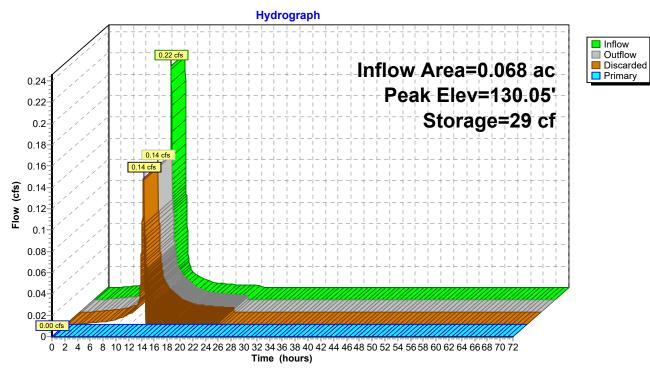
Plug-Flow detention time= (not calculated: outflow precedes inflow) Center-of-Mass det. time= 0.6 min (755.9 - 755.3)

Volume	Invert	Avail.Sto	rage Storage	Description		
#1	130.00'	76	3 cf Custom	Stage Data (Pyra	amidal)Listed below	(Recalc) x 6
Elevatio		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
130.0	00	102	0	0	102	
131.5	50	16	79	79	198	
132.5	50	16	16	95	214	
133.5	50	16	16	111	230	
134.5	50	16	16	127	246	
Device	Routing	Invert	Outlet Devices	S		
#1	Discarded	130.00'	2.410 in/hr Ex	xfiltration X 4.00	over Surface area	
			Conductivity to	o Groundwater Ele	evation = 120.00'	
#2	Primary	133.50'	4.0" Round (	Culvert X 4.00		
					eadwall, Ke= 0.900	
					33.25' S= 0.0250 '/'	
			n = 0.010 PVC	C, smooth interior,	Flow Area= 0.09 sf	

Discarded OutFlow Max=0.14 cfs @ 12.16 hrs HW=130.05' (Free Discharge) **1=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=130.00' TW=0.00' (Dynamic Tailwater) **2=Culvert** (Controls 0.00 cfs)

## **Pond P1: Infiltration System**



**Drainage Design** 

Type III 24-hr 10-Year Rainfall=4.86"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentRoof 1: Prop Roof Runoff Area=2,950 sf 100.00% Impervious Runoff Depth=4.62"

Tc=5.0 min CN=98 Runoff=0.33 cfs 0.026 af

SubcatchmentSite 1: Site Runoff Area=76,861 sf 15.91% Impervious Runoff Depth=0.85"

Flow Length=160' Tc=14.0 min CN=54 Runoff=1.02 cfs 0.125 af

Reach CP1: Wetlands

Inflow=1.02 cfs 0.125 af
Outflow=1.02 cfs 0.125 af

Pond P1: Infiltration System Peak Elev=130.18' Storage=102 cf Inflow=0.33 cfs 0.026 af

Discarded=0.14 cfs 0.026 af Primary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.026 af

Total Runoff Area = 1.832 ac Runoff Volume = 0.152 af Average Runoff Depth = 0.99" 80.98% Pervious = 1.484 ac 19.02% Impervious = 0.348 ac

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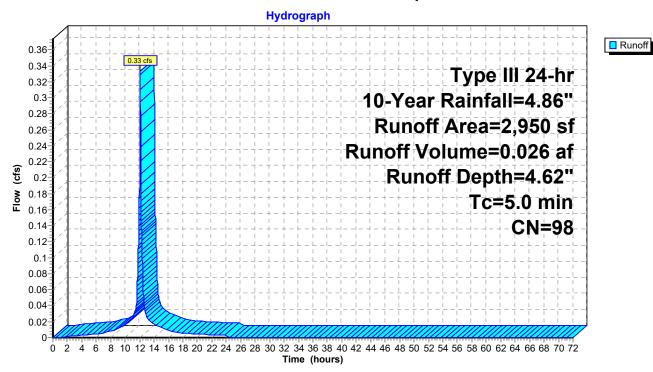
## **Summary for Subcatchment Roof 1: Prop Roof**

Runoff = 0.33 cfs @ 12.07 hrs, Volume= 0.026 af, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.86"

A	rea (sf)	CN [	Description		
	2,950	98 F	Roofs, HSC	Α	
	2,950	•	100.00% In	npervious A	Area
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

## **Subcatchment Roof 1: Prop Roof**



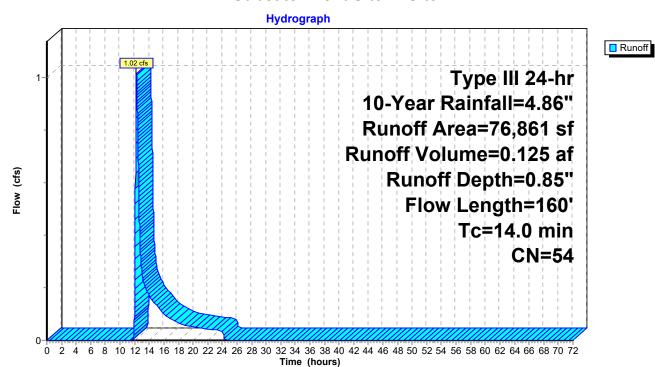
## **Summary for Subcatchment Site 1: Site**

Runoff = 1.02 cfs @ 12.24 hrs, Volume= 0.125 af, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.86"

A	rea (sf)	CN E	<b>Description</b>		
	11,835	98 F	aved park	ing, HSG A	1
	392	98 F	Roofs, HSG	βA	
	4,336	76 C	Gravel road	ls, HSG A	
	60,298	43 V	Voods/gras	ss comb., F	air, HSG A
	76,861	54 V	Veighted A	verage	
	64,634	8	4.09% Per	vious Area	r
	12,227	1	5.91% Imp	ervious Ar	ea
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
0.4	50	0.1800	2.12		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
1.9	25	0.2000	0.22		Sheet Flow,
					Grass: Dense n= 0.240 P2= 3.27"
11.7	85	0.0230	0.12		Sheet Flow,
					Grass: Dense n= 0.240 P2= 3.27"
14.0	160	Total			

#### **Subcatchment Site 1: Site**



## **Summary for Reach CP1: Wetlands**

[40] Hint: Not Described (Outflow=Inflow)

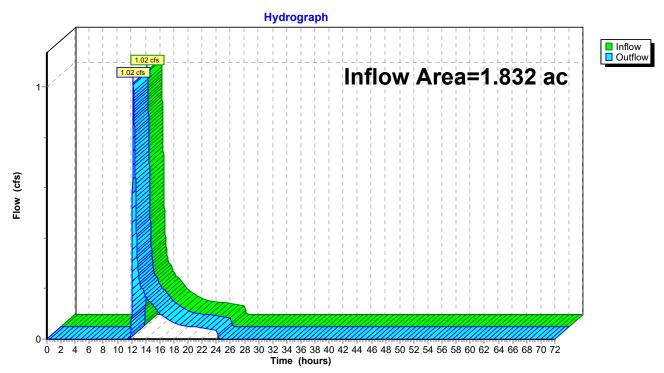
Inflow Area = 1.832 ac, 19.02% Impervious, Inflow Depth = 0.82" for 10-Year event

Inflow = 1.02 cfs @ 12.24 hrs, Volume= 0.125 af

Outflow = 1.02 cfs @ 12.24 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2

#### **Reach CP1: Wetlands**



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## **Summary for Pond P1: Infiltration System**

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=569)

0.068 ac,100.00% Impervious, Inflow Depth = 4.62" for 10-Year event Inflow Area = Inflow 0.33 cfs @ 12.07 hrs, Volume= 0.026 af Outflow 0.14 cfs @ 12.25 hrs, Volume= 0.026 af, Atten= 58%, Lag= 10.6 min Discarded = 0.14 cfs @ 12.25 hrs, Volume= 0.026 af 0.00 hrs, Volume= Primary 0.00 cfs @ 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2 Peak Elev= 130.18' @ 12.25 hrs Surf.Area= 527 sf Storage= 102 cf

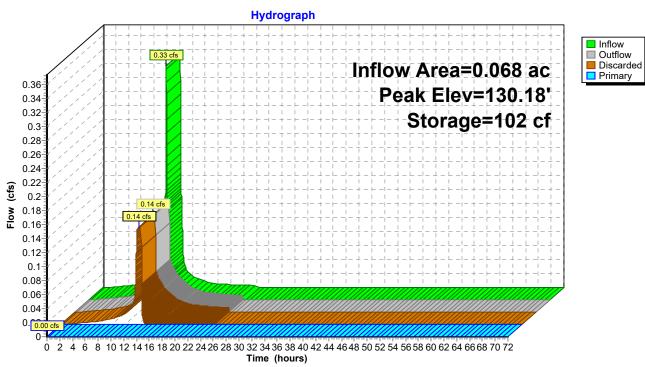
Plug-Flow detention time= (not calculated: outflow precedes inflow) Center-of-Mass det. time= 2.6 min (750.1 - 747.6)

Volume	Invert	Avail.Sto	rage Storage	Description		
#1	130.00'	76	63 cf Custom	n Stage Data (Pyra	amidal)Listed below	(Recalc) x 6
Elevation (fee		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
130.0		102	Ó	Ó	102	
131.5	50	16	79	79	198	
132.5	50	16	16	95	214	
133.5	50	16	16	111	230	
134.5	50	16	16	127	246	
Device	Routing	Invert	Outlet Device	es		
#1	Discarded	130.00'	2.410 in/hr E	xfiltration X 4.00	over Surface area	
				to Groundwater Ele	evation = 120.00'	
#2	Primary	133.50'		Culvert X 4.00		
					eadwall, Ke= 0.900	0 0000
					33.25' S= 0.0250 '/'	
			n= 0.010 PV	C, smooth interior,	Flow Area= 0.09 sf	

Discarded OutFlow Max=0.14 cfs @ 12.25 hrs HW=130.18' (Free Discharge) **1=Exfiltration** (Controls 0.14 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=130.00' TW=0.00' (Dynamic Tailwater) **2=Culvert** (Controls 0.00 cfs)

## **Pond P1: Infiltration System**



**Drainage Design** 

Type III 24-hr 25-Year Rainfall=6.15"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentRoof 1: Prop Roof Runoff Area=2,950 sf 100.00% Impervious Runoff Depth=5.91"

Tc=5.0 min CN=98 Runoff=0.42 cfs 0.033 af

SubcatchmentSite 1: Site Runoff Area=76,861 sf 15.91% Impervious Runoff Depth=1.52"

Flow Length=160' Tc=14.0 min CN=54 Runoff=2.14 cfs 0.224 af

Reach CP1: Wetlands Inflow=2.14 cfs 0.224 af
Outflow=2.14 cfs 0.224 af

Pond P1: Infiltration System Peak Elev=130.35' Storage=184 cf Inflow=0.42 cfs 0.033 af

Discarded=0.14 cfs 0.033 af Primary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.033 af

Total Runoff Area = 1.832 ac Runoff Volume = 0.258 af Average Runoff Depth = 1.69" 80.98% Pervious = 1.484 ac 19.02% Impervious = 0.348 ac

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Runoff

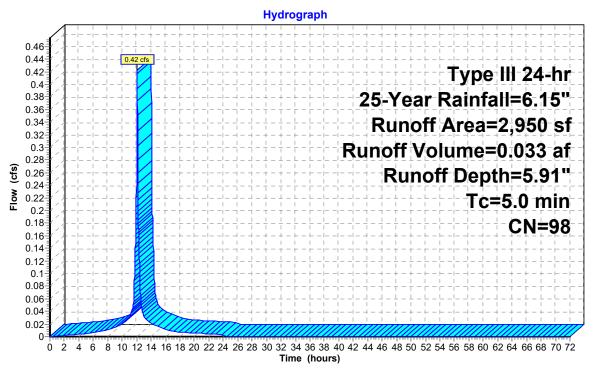
## **Summary for Subcatchment Roof 1: Prop Roof**

Runoff = 0.42 cfs @ 12.07 hrs, Volume= 0.033 af, Depth= 5.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.15"

A	rea (sf)	CN [	Description		
	2,950	98 F	Roofs, HSC	Α	
	2,950	1	100.00% In	npervious A	Area
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

## **Subcatchment Roof 1: Prop Roof**



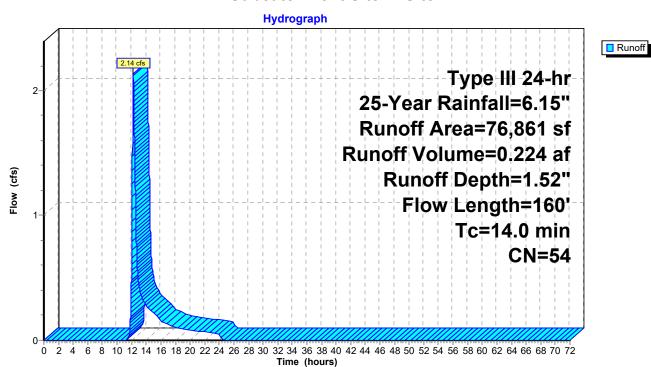
## **Summary for Subcatchment Site 1: Site**

Runoff = 2.14 cfs @ 12.21 hrs, Volume= 0.224 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.15"

Aı	rea (sf)	CN E	<b>Description</b>							
	11,835	98 F	aved park	ing, HSG A	1					
	392	98 F	· · · · · · · · · · · · · · · · · · ·							
	4,336	76 C	76 Gravel roads, HSG A							
	60,298	43 V	Voods/gras	ss comb., F	air, HSG A					
	76,861 54 Weighted Average			verage						
	64,634	8	84.09% Pervious Area							
	12,227	15.91% Impervious Area								
Tc	Length	Slope	Velocity	Capacity	Description					
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
0.4	50	0.1800	2.12		Shallow Concentrated Flow,					
					Woodland Kv= 5.0 fps					
1.9	25	0.2000	0.22		Sheet Flow,					
					Grass: Dense n= 0.240 P2= 3.27"					
11.7	85	0.0230	0.12		Sheet Flow,					
					Grass: Dense n= 0.240 P2= 3.27"					
14.0	160	Total								

#### **Subcatchment Site 1: Site**



## **Summary for Reach CP1: Wetlands**

[40] Hint: Not Described (Outflow=Inflow)

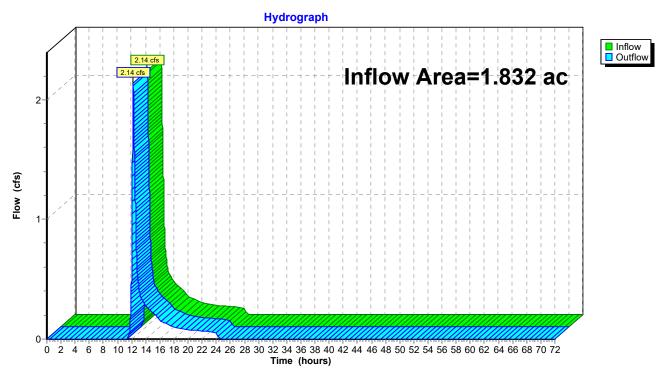
Inflow Area = 1.832 ac, 19.02% Impervious, Inflow Depth = 1.47" for 25-Year event

Inflow = 2.14 cfs @ 12.21 hrs, Volume= 0.224 af

Outflow = 2.14 cfs @ 12.21 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2

#### **Reach CP1: Wetlands**



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## **Summary for Pond P1: Infiltration System**

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=555)

0.068 ac,100.00% Impervious, Inflow Depth = 5.91" for 25-Year event Inflow Area = Inflow 0.42 cfs @ 12.07 hrs, Volume= 0.033 af Outflow 0.14 cfs @ 12.33 hrs, Volume= 0.033 af, Atten= 67%, Lag= 15.6 min Discarded = 0.14 cfs @ 12.33 hrs, Volume= 0.033 af 0.00 hrs, Volume= Primary 0.00 cfs @ 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2 Peak Elev= 130.35' @ 12.33 hrs Surf.Area= 453 sf Storage= 184 cf

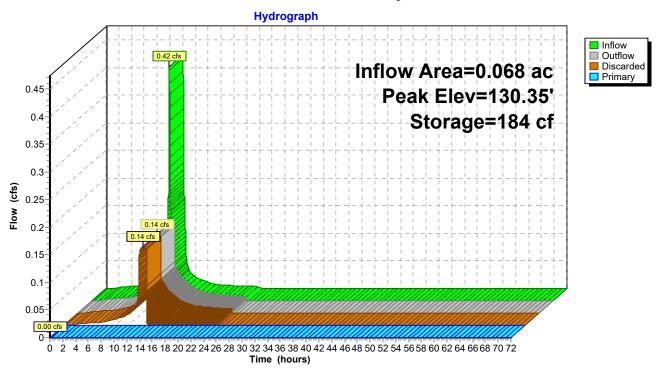
Plug-Flow detention time= (not calculated: outflow precedes inflow) Center-of-Mass det. time= 5.0 min (748.9 - 743.9)

Volume	Invert	Avail.Sto	rage Storage	Description				
#1	130.00'	76	3 cf Custom	Stage Data (Pyra	amidal)Listed below	(Recalc) x 6		
Elevatio		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)			
130.0	00	102	0	0	102			
131.5	50	16	79	79	198			
132.5	50	16	16	95	214			
133.5	50	16	16	111	230			
134.5	50	16	16	127	246			
Device	Routing	Invert	Outlet Devices	S				
#1	Discarded	130.00'	2.410 in/hr Ex	xfiltration X 4.00	over Surface area			
			Conductivity to	o Groundwater Ele	evation = 120.00'			
#2	#2 Primary 133.50		4.0" Round Culvert X 4.00					
					eadwall, Ke= 0.900			
					33.25' S= 0.0250 '/'			
			n = 0.010 PV0	C, smooth interior,	Flow Area= 0.09 sf			

**Discarded OutFlow** Max=0.14 cfs @ 12.33 hrs HW=130.35' (Free Discharge) **1=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=130.00' TW=0.00' (Dynamic Tailwater) **2=Culvert** (Controls 0.00 cfs)

## **Pond P1: Infiltration System**



**Drainage Design** 

Type III 24-hr 100-Year Rainfall=8.80"

Prepared by ITS

Printed 10/11/2021

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentRoof 1: Prop Roof Runoff Area=2,950 sf 100.00% Impervious Runoff Depth=8.56"

Tc=5.0 min CN=98 Runoff=0.61 cfs 0.048 af

SubcatchmentSite 1: Site Runoff Area=76,861 sf 15.91% Impervious Runoff Depth=3.22"

Flow Length=160' Tc=14.0 min CN=54 Runoff=4.99 cfs 0.474 af

Reach CP1: Wetlands

Inflow=4.99 cfs 0.474 af
Outflow=4.99 cfs 0.474 af

Pond P1: Infiltration System Peak Elev=130.97' Storage=391 cf Inflow=0.61 cfs 0.048 af

Discarded=0.15 cfs 0.048 af Primary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.048 af

Total Runoff Area = 1.832 ac Runoff Volume = 0.523 af Average Runoff Depth = 3.42" 80.98% Pervious = 1.484 ac 19.02% Impervious = 0.348 ac HydroCAD® 10.00-19 s/n 00759 © 2016 HydroCAD Software Solutions LLC

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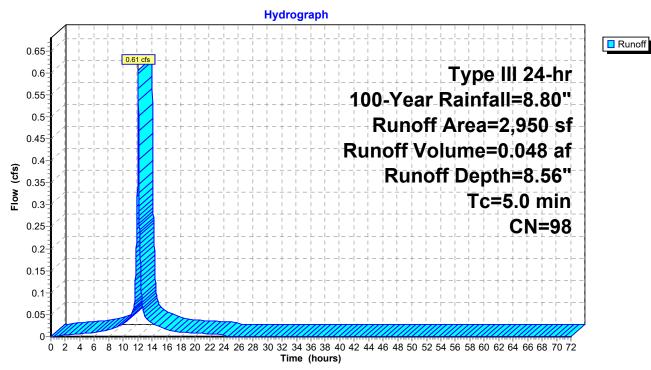
## **Summary for Subcatchment Roof 1: Prop Roof**

Runoff = 0.61 cfs @ 12.07 hrs, Volume= 0.048 af, Depth= 8.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.80"

A	rea (sf)	CN [	Description							
	2,950	98 F	Roofs, HSG A							
	2,950	100.00% Impervious Area								
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description					
5.0					Direct Entry,					

## **Subcatchment Roof 1: Prop Roof**



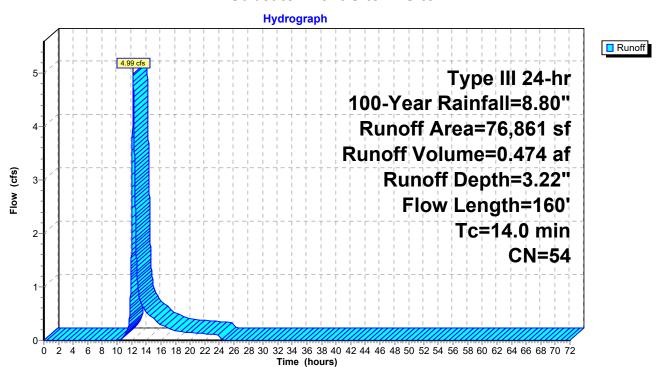
## **Summary for Subcatchment Site 1: Site**

Runoff = 4.99 cfs @ 12.21 hrs, Volume= 0.474 af, Depth= 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.80"

A	rea (sf)	CN D	escription							
	11,835	98 Paved parking, HSG A								
	392	98 F	· • • • • • • • • • • • • • • • • • • •							
	4,336	76 G	76 Gravel roads, HSG A							
	60,298	43 V	Voods/gras	ss comb., F	air, HSG A					
	76,861 54 Weighted Average			verage						
	64,634	8	84.09% Pervious Area							
	12,227	15.91% Impervious Area								
Tc	Length	Slope	Velocity	Capacity	Description					
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
0.4	50	0.1800	2.12		Shallow Concentrated Flow,					
					Woodland Kv= 5.0 fps					
1.9	25	0.2000	0.22		Sheet Flow,					
					Grass: Dense n= 0.240 P2= 3.27"					
11.7	85	0.0230	0.12		Sheet Flow,					
					Grass: Dense n= 0.240 P2= 3.27"					
14.0	160	Total								

#### **Subcatchment Site 1: Site**



## **Summary for Reach CP1: Wetlands**

[40] Hint: Not Described (Outflow=Inflow)

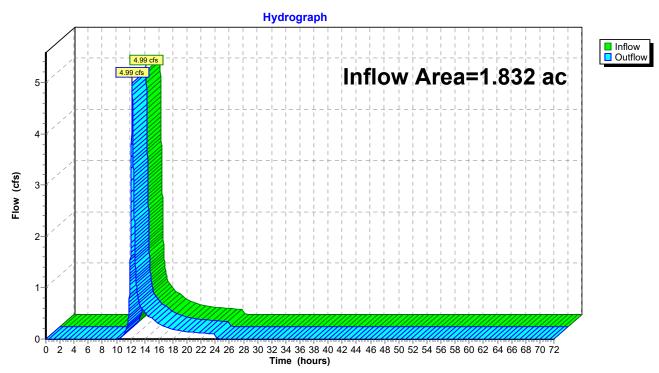
1.832 ac, 19.02% Impervious, Inflow Depth = 3.11" for 100-Year event Inflow Area =

Inflow 4.99 cfs @ 12.21 hrs, Volume= 0.474 af

Outflow 4.99 cfs @ 12.21 hrs, Volume= 0.474 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2

## **Reach CP1: Wetlands**



Volume

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## **Summary for Pond P1: Infiltration System**

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=521)

Inflow Area = 0.068 ac,100.00% Impervious, Inflow Depth = 8.56" for 100-Year event
Inflow = 0.61 cfs @ 12.07 hrs, Volume= 0.048 af
Outflow = 0.15 cfs @ 12.43 hrs, Volume= 0.048 af, Atten= 75%, Lag= 21.5 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2 Peak Elev= 130.97' @ 12.43 hrs Surf.Area= 229 sf Storage= 391 cf

Avail Storage Storage Description

Plug-Flow detention time= (not calculated: outflow precedes inflow) Center-of-Mass det. time= 11.8 min ( 750.9 - 739.1 )

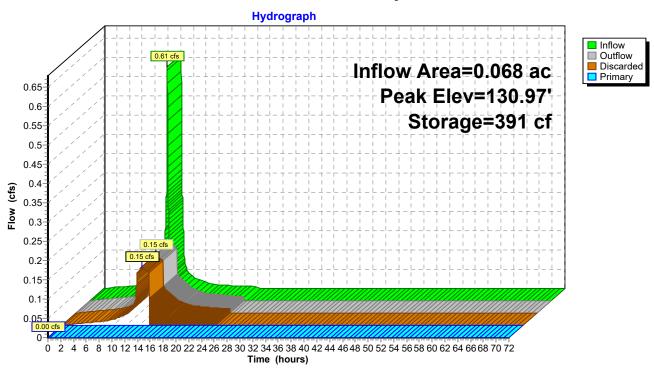
volume	invert	Avaii.Sto	rage Storage	Description		
#1	130.00'	76	3 cf Custom	Stage Data (Pyra	amidal)Listed below	(Recalc) x 6
Elevatio (fee		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
	,		(cubic-leet)	(Cubic-leet)		
130.0	0	102	0	0	102	
131.5	0	16	79	79	198	
132.5	0	16	16	95	214	
133.5	0	16	16	111	230	
134.5	0	16	16	127	246	
Device	Routing	Invert	Outlet Devices	3		
#1	Discarded	130.00'	2.410 in/hr Ex	filtration X 4.00	over Surface area	
			Conductivity to	o Groundwater Ele	evation = 120.00'	
#2	Primary	133.50'	4.0" Round (	Culvert X 4.00		
L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.50' / 133.25' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf						

**Discarded OutFlow** Max=0.15 cfs @ 12.43 hrs HW=130.97' (Free Discharge) **1=Exfiltration** (Controls 0.15 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=130.00' TW=0.00' (Dynamic Tailwater) 2=Culvert (Controls 0.00 cfs)

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## **Pond P1: Infiltration System**



# **APPENDIX C**

Hydrologic Soil Map & Natural Heritage Map



#### MAP LEGEND MAP INFORMATION The soil surveys that comprise your AOI were mapped at Area of Interest (AOI) С 1:25.000. Area of Interest (AOI) C/D Soils Warning: Soil Map may not be valid at this scale. D Soil Rating Polygons Enlargement of maps beyond the scale of mapping can cause Not rated or not available Α misunderstanding of the detail of mapping and accuracy of soil **Water Features** line placement. The maps do not show the small areas of A/D contrasting soils that could have been shown at a more detailed Streams and Canals Transportation B/D Rails ---Please rely on the bar scale on each map sheet for map measurements. Interstate Highways C/D Source of Map: Natural Resources Conservation Service **US Routes** Web Soil Survey URL: D Major Roads Coordinate System: Web Mercator (EPSG:3857) Not rated or not available -Local Roads Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts Soil Rating Lines Background distance and area. A projection that preserves area, such as the Aerial Photography Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required. This product is generated from the USDA-NRCS certified data as of the version date(s) listed below. Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts Survey Area Data: Version 16, Jun 11, 2020 Soil map units are labeled (as space allows) for map scales 1:50.000 or larger. Not rated or not available Date(s) aerial images were photographed: Jul 28, 2019—Oct 19, 2020 **Soil Rating Points** The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background A/D imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident. B/D

# **Hydrologic Soil Group**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI			
52	Freetown muck, 0 to 1 percent slopes	B/D	9.1	26.0%			
245B	Hinckley loamy sand, 3 to 8 percent slopes	А	8.3	23.8%			
245C	Hinckley loamy sand, 8 to 15 percent slopes	А	0.4	1.1%			
253D	Hinckley loamy sand, 15 to 35 percent slopes	А	7.7	22.2%			
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	6.4	18.3%			
260B	Sudbury fine sandy loam, 2 to 8 percent slopes	В	0.0	0.0%			
602	Urban land, 0 to 15 percent slopes		3.0	8.6%			
Totals for Area of Interest			34.8	100.0%			

### **Description**

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

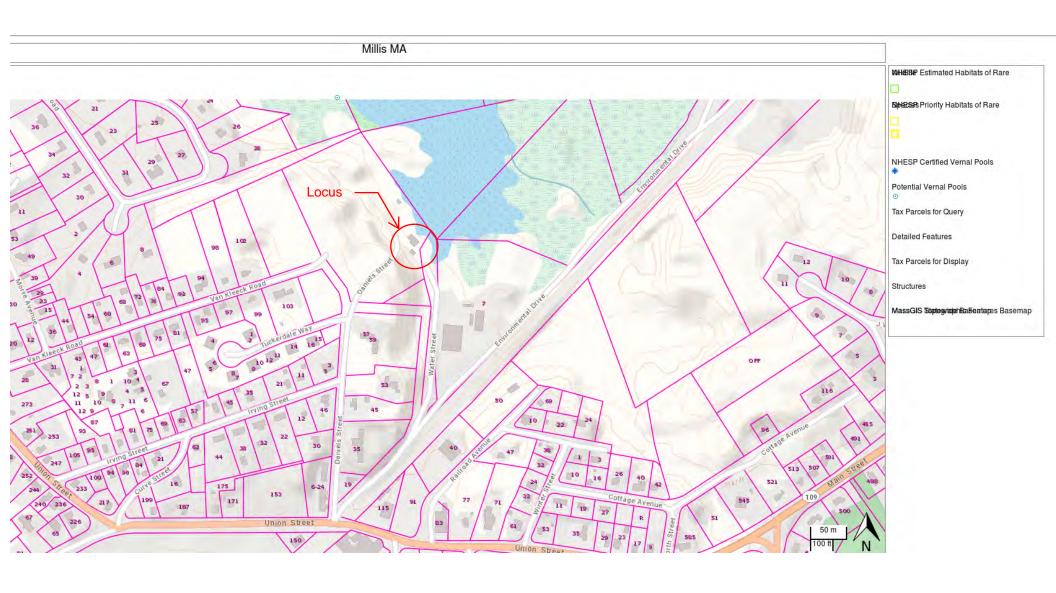
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

### **Rating Options**

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



# APPENDIX D

Operation and Maintenance Plan & Long Term Pollution Prevention Plan

## **OPERATION AND MAINTENANCE PLAN**

&

## LONG TERM POLLUTION PREVENTION PLAN

### **TABLE OF CONTENTS**

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	1.2 O&M RESPONSIBILITIES.	1
	1.3 SCHEDULE FOR INSPECTION AND MAINTENANCE	1
	1.4 OPERATION OF BEST MANAGEMENT PRACTICES	2
	1.5 MAINTENANCE	2
	1.6 SCHEDULE OF INSPECTION AND MAINTENANCE	2
	1.8 O&M LOG FORM	3
2	LONG TERM POLLUTION PREVENTION PLAN	
	2.1 HOUSEKEEPING OPERATIONS	4

### **SECTION 1**

i

#### **OPERATION AND MAINTENANCE**

This Operation and Maintenance Plan (O&M Plan) was prepared to ensure that all soil erosion and stormwater runoff control facilities and measures are maintained during and after construction. Regular inspections and maintenance are essential for long-term effectiveness of soil erosion and stormwater runoff control facilities and measures. If not properly maintained, these facilities and measures will not operate as designed and will not provide effective treatment of stormwater runoff. The Millis Water Department and DPW will be responsible for performing the regular inspections and required maintenance for the stormwater treatment practices to be installed as part of the project. The following is an outline of these inspection and maintenance procedures.

#### 1.1 BMP OWNERS

The OWNERS of the BMP's shall be the person, persons, trust, corporation, etc., or their successors who have title to the land on which the BMP is located. It is anticipated that all BMP's will be owned and maintained by the Town of Millis Water Department. Should the title of land upon which they are located is transferred the purchaser of the property, at that time, will assume all responsibilities set forth within this document.

#### 1.2 OPERATION AND MAINTENANCE RESPONSIBILITIES

- The party or parties responsible for the funding, operation and maintenance of the BMP's shall be the Town of Millis Water Department or their designees.
- BMP's each have specific maintenance requirements to ensure long-term effectiveness. These stormwater management systems will be operated, inspected and maintained on a regular basis by a qualified professional with expertise in inspecting drainage system components. All of the stormwater BMP's shall be kept in good working order at all times.
- A maintenance agreement providing for the funding, operation and maintenance of all the stormwater management BMP's shall be provided.

#### 1.3 SCHEDULE FOR INSPECTION AND MAINTENANCE

- BMP's each have specific maintenance requirements to ensure long-term effectiveness. These stormwater management systems will be operated, inspected and maintained on a regular basis in accordance with this manual. All of the stormwater BMP's shall be kept in good working order at all times.
- As a minimum, the Town of Millis Water Department shall follow the general guidelines outlined herein for the BMP's provided on this site.
- An Operation and Maintenance log will be maintained by the Town of Millis Water Department. Logs will be maintained for the last three years, outlining inspections, repairs,

1

replacement and disposal for each Best Management Practice (BMP). In the case of disposal, the log shall indicate the type and material and the disposal location.

#### 1.4 **MAINTENANCE**

The proposed infiltration system will collect stormwater from the proposed roof of the Water Treatment Building. This water is considered clean and limited maintenance should be associated with the proposed infiltration system. If cleaning of the infiltration system is required it shall be cleaned with a vacuum truck to remove all debris that accumulates within the system.

#### 1.5 SCHEDULE OF INSPECTION AND MAINTENANCE

Inspection of the infiltration system shall occur at least twice a year, spring and fall. If visual inspections shows an accumulation of debris, leaves and dirt, the owners shall clean the system with a vacuum truck to remove the debris.

#### 1.8 O&M LOG FORM

**Stormwater BMP Inspection and Maintenance Log** 

Facility Name										
Address										
Begin Date				End Date						
Date	BMP ID#	BMP Description	Inspected by:	Cause for Inspection	Exceptions Noted	Comments and Action Taken				

**Instructions:** Record all inspections and maintenance for all treatment BMPs on this form. Use additional log sheets and/or attach extended comments or documentation as necessary. Submit a copy of the completed log with the annual independent inspectors' report to the municipality, and start a new log at that time.

- BMP ID# Always use ID# from the Operation and Maintenance Manual.
- Inspected by Note all inspections and maintenance on this form, including the required independent annual inspection.
- Cause for inspection Note if the inspection is routine, pre-rainy-season, post-storm, annual, or in response to a noted problem or complaint.
- Exceptions noted Note any condition that requires correction or indicates a need for maintenance.
   Comments and actions taken Describe any maintenance done and need for follow-up.

### **SECTION 2**

### LONG TERM POLLUTION PREVENTION PLAN

#### 2.1 HOUSEKEEPING OPERATIONS

- 1. Good housekeeping and material management reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.
  - a. All materials stored on-site must be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
  - b. Products shall be kept in their original containers with the original manufacturer's label.
  - c. Substances should not be mixed with one another unless recommended by the manufacturer.
  - d. Whenever possible, all of a product will be used up before disposing of a container.
  - e. Original materials label and material safety data sheets (MSDS) shall be kept by the Owner.
  - f. Petroleum products:
    - ☐ All on-site vehicles and parking areas shall be monitored weekly for leaks and spills. Spills shall be cleaned immediately.
    - ☐ Petroleum products shall be stored under cover and shall be in tightly sealed containers that are clearly labeled.
  - g. Fertilizers:
    - Fertilizers will not be used on the site due to it being a Zone A to a surface water used for public water supply.
  - h. Paints solvents.
    - ☐ All paints and solvents shall be stored in original manufacturer's containers in a covered location.
    - ☐ The use of paints and solvents shall, whenever possible, be limited to service or storage bays. Where not possible, the work area shall be protected with impermeable drop clothes or tarps. At no point shall material be used in parking or access ways that are tributaries to the drainage system.

### 2. Spill Control Practices:

a. Manufacturer's recommended methods shall be clearly posted for spill clean-up and Water Department personnel shall be made aware of the procedures and the locations of cleanup information and supplies.

- b. Material and equipment necessary for spill clean-up will be kept on-site in a designated material storage area. Equipment will include, but not be limited to, brooms, dust pans, mops, rags, gloves, goggles, absorbent materials, sand, sawdust and plastic & metal trash containers specifically kept and labeled for this purpose.
- c. All spills must be cleaned-up immediately after discovery.
- d. Spills of toxic or hazardous material must be reported to the appropriate state, local or federal agency, as required by-law.
- 3. The washing of vehicles shall be limited to areas within the buildings that are served by a floor drain system and on-site tight tank. Wash water with its combination of solvents, detergents and oil/greases should not be allowed to enter any part of the on-site drainage system.
- 4. Snow plowing operations shall stockpile snow, ice and accumulated materials in areas where snow melt will flow into the onsite drainage systems, including drainage basins. No plowing or storage of snow is allowed in bio-retention areas or wetland resource areas.
- 5. During winter conditions sand use site-wide shall be applied to the minimum extent possible to maintain safe conditions.
- 6. The usage of Sodium Chloride for snow and ice removal shall be used with caution and limited due to the proximity of the site to an outstanding water resource.